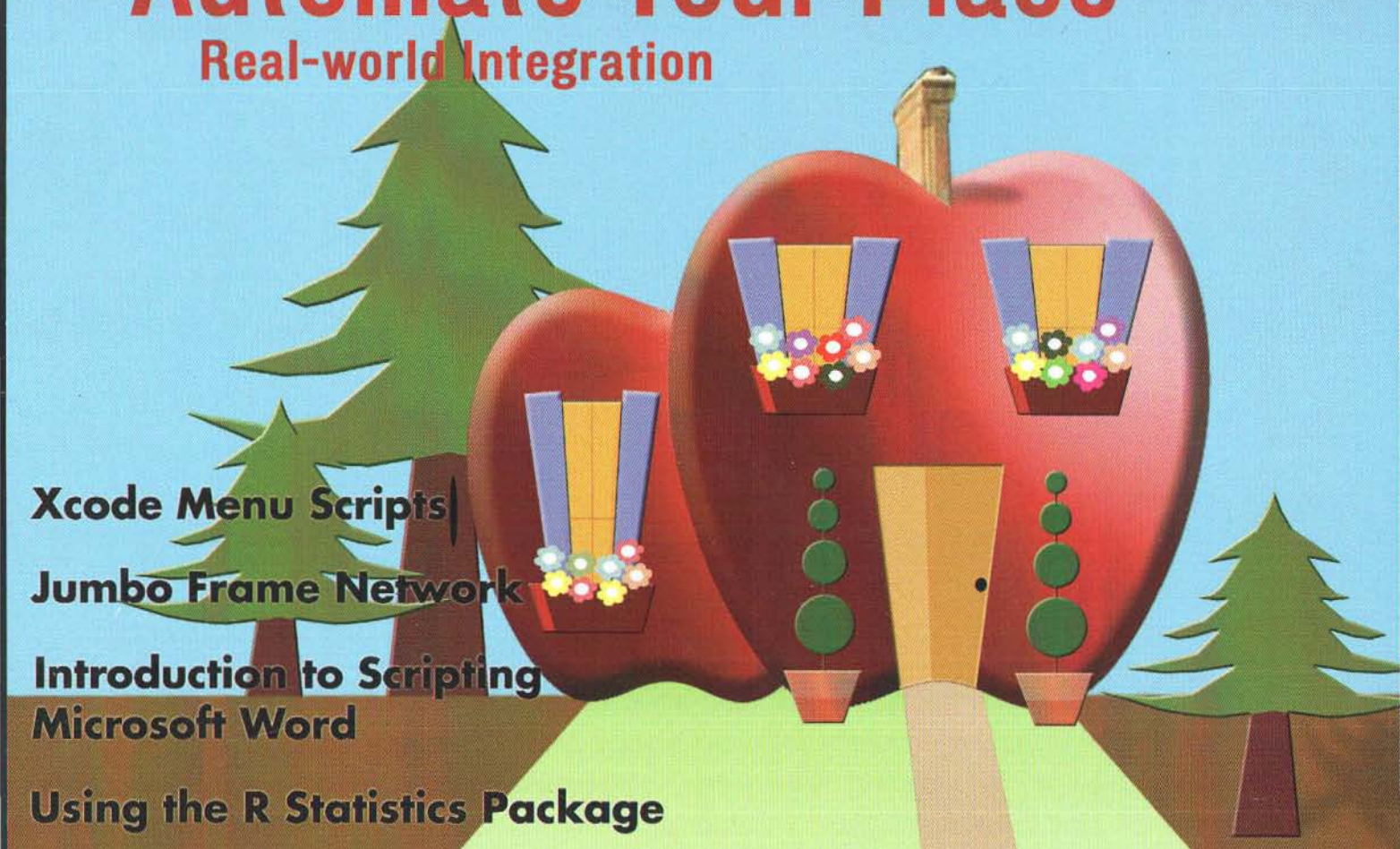
Can RAID be Used for Backup?

MacTechMagazine
January • 2007

MACTECH®

The Journal of Macintosh Technology

Home Sweet Home
Automate Your Place
Real-world Integration



Xcode Menu Scripts

Jumbo Frame Network

Introduction to Scripting Microsoft Word

Using the R Statistics Package

Logs: Everything you need to know about your system

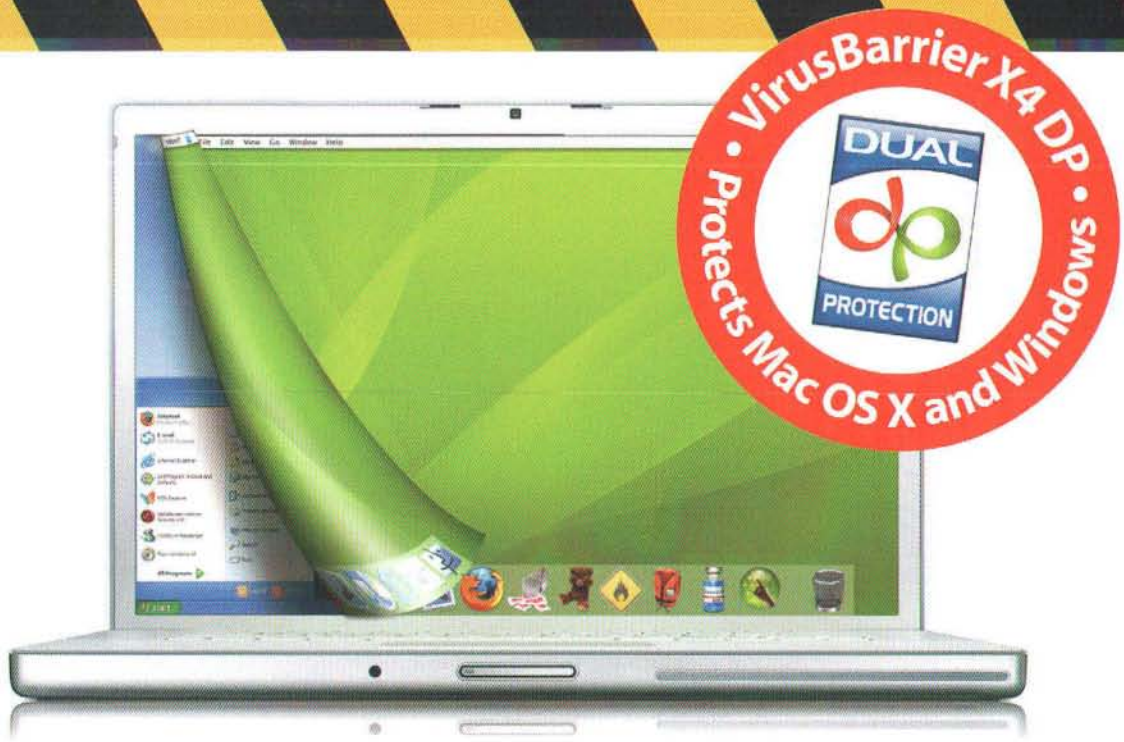
MACTECH.COM

$8.95 US, $12.95 Canada

01

0 32128 74887 8

ISSN 1067-8360 Printed in U.S.A.



The #1 Mac antivirus solution and the #1 Windows antivirus program in a single package

Running Windows on a Mac is possible with today's Intel-based Macs, but this opens up a whole new range of security threats. Viruses, spyware, adware and hackers are all waiting to infect your Windows installation.

Intego, the leader in Mac security software, and BitDefender, the top PC security vendor, have joined forces to offer you **Intego Dual Protection**.

Protect Mac OS X and Windows from all known viruses with **Intego VirusBarrier X4 DP***.

Keep Mac OS X and Windows safe from hackers, vandals, viruses, spyware, spam and phishing with **Internet Security Barrier X4 Antispam Edition DP****.

Now, more than ever, you need full protection for both Mac OS X and Windows. Intego Dual Protection gives you all the security you need.

#1 VirusBarrier + #1 bitdefender

VirusBarrier rated best Mac antivirus by Macworld - BitDefender rated best Windows antivirus by PC World

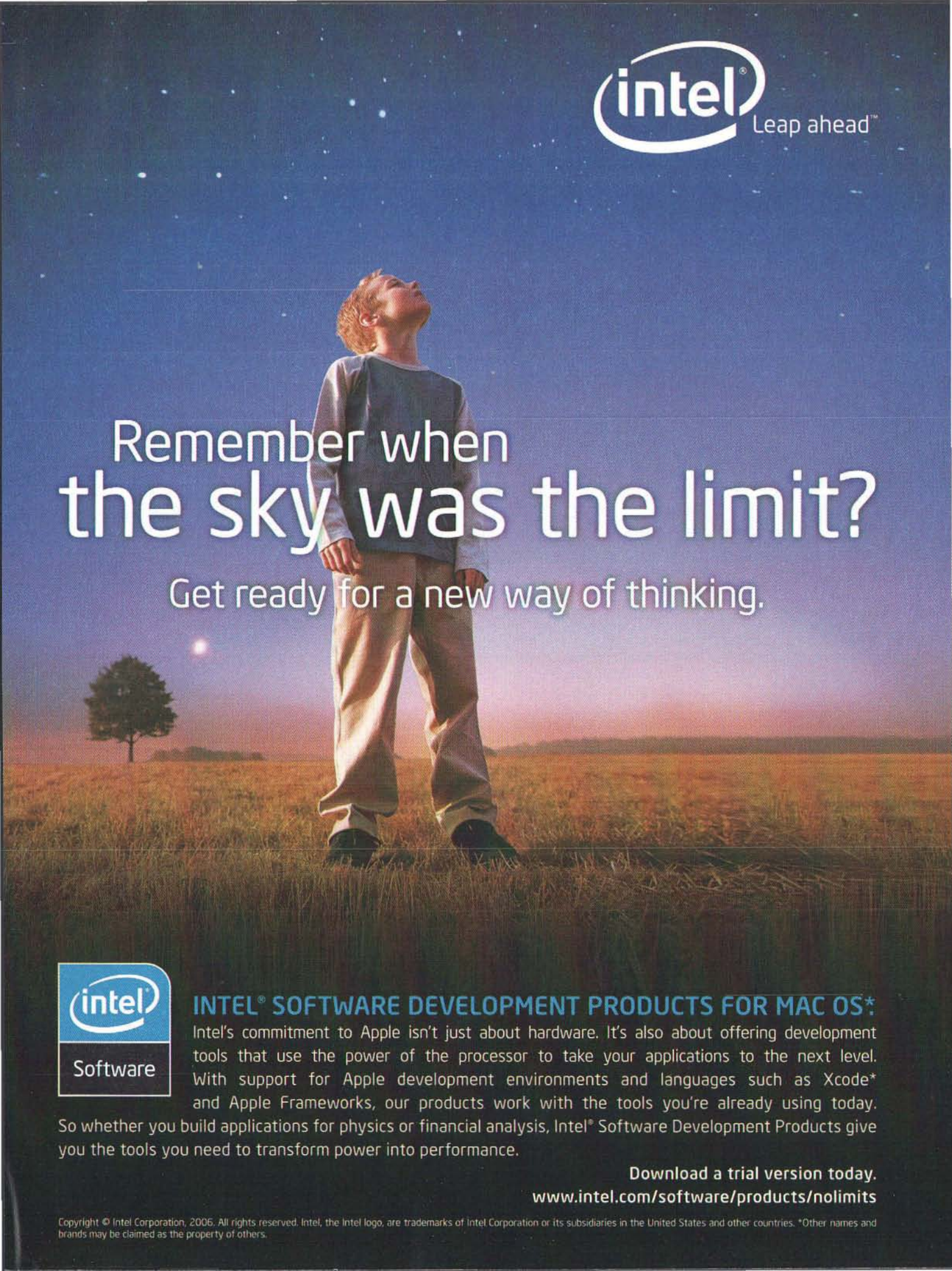
* Contains Intego VirusBarrier X4 and BitDefender Antivirus. ** Contains Intego NetBarrier X4, VirusBarrier X4, Personal Antispam X4, and BitDefender Antivirus, Firewall, Antispyware, Antispam and Antiphishing.

Macintosh, Mac, the Mac logo and Apple Mail are registered trademarks of Apple Computer. BitDefender and the BitDefender logo are registered trademarks of Softwin.
© 2001 - 2007 Intego, the Intego logo, VirusBarrier, the VirusBarrier logo, Dual Protection (DP) and the Dual Protection logo are registered trademarks of Intego.
All other brand and product names are or may be trademarks of, and are used to identify products or services of, their respective owner. Intego is not responsible for omissions or errors in typography or photography.

Macworld Conference & Expo
JANUARY 9-12, 2007
The Moscone Center - San Francisco
Booth S 2338

www.intego.com

intego



intel Software

INTEL® SOFTWARE DEVELOPMENT PRODUCTS FOR MAC OS*.

Intel's commitment to Apple isn't just about hardware. It's also about offering development tools that use the power of the processor to take your applications to the next level. With support for Apple development environments and languages such as Xcode* and Apple Frameworks, our products work with the tools you're already using today. So whether you build applications for physics or financial analysis, Intel® Software Development Products give you the tools you need to transform power into performance.

Download a trial version today.
www.intel.com/software/products/nolimits

Copyright © Intel Corporation, 2006. All rights reserved. Intel, the Intel logo, are trademarks of Intel Corporation or its subsidiaries in the United States and other countries. *Other names and brands may be claimed as the property of others.

You've probably never heard of us before...

...but chances are, you are using the products we have developed!

consumer

education

creative &

professional

gaming

As a moviemaker, our work has probably enabled you to interactively edit and create movies; to unwind and reenergize you, our gaming works have probably done it already. As an educator, our work has probably helped you to improve the mathematical and reading skills of your students. Remember you were able to calculate your taxes easily this time? We helped you a little out here.

Leveraging from a decade of strength and success, our Mac services have provided a ground for clients to expand their markets, substantially. Through our single minded focus, professionalism, technical expertise and timely delivery processes, we have challenged the unknown to work on next gen platforms and broken new grounds.

With the Mac market rapidly gaining mind share and market share, are you positioned to take advantage of this opportunity?

Come talk to us. Let's chart new territories together!

Visit us at:
Macworld
San Francisco
January 9-12, 2007
Stall 4437

services@robosoftin.com ✦ www.robosoftin.com

Mac Universal

Robosoft®

TABLE OF CONTENTS

ARTICLES & DEPARTMENTS

AppleScript Essentials

Introduction to Scripting Microsoft Word
by Benjamin S. Waldie 8

Can RAID be used for Backup?
by Tim Standing 14

Xcode Menu Scripts
Creating and installing Xcode menu scripts using Xcode
by Jose R.C. Cruz 24

The R statistics package
What is R and how you can use it.
by Mihalis Tsoukalos 34

Automate Your Place, part 1
Real-world Integration
by Andrew Turner 46

Mac In The Shell

On Logs
Everything you need to know about your system
by Edward Marczak 54

Jumbo Frame Networks
Tap into extra Ethernet Speed
by Steve Modica 64

MacTech Spotlight Featuring:
Christoph Nadig and Pascal Freiburghaus 88

We're Easier.

Create anything from simple utilities to complex applications. Just drag and drop interface elements while REALbasic handles the details. You concentrate on what makes your app great -- your ideas! REALbasic creates native, compiled applications for Mac, Windows and Linux. It's the powerful, easy-to-use tool for creating your own software.

Complex problems shouldn't require complex solutions. The answer is REALbasic.

REALbasic

Try REALbasic today at www.realbasic2007.com

Communicate With Us

Department E-Mails

Orders, Circulation, & Customer Service
cust_service@mactech.com

Press Releases
press_releases@mactech.com

Ad Sales
adsales@mactech.com

Editorial
editorial@mactech.com
(Authors only, no pr)

Accounting
accounting@mactech.com

Marketing
marketing@mactech.com

General
info@mactech.com

Web Site
http://www.mactech.com

In this electronic age, the art of communication has become both easier and more complicated. Is it any surprise that we prefer **e-mail?**

If you have any questions, feel free to call us at 805/494-9797 or fax us at 805/494-9798.

If you would like a subscription or need customer service, feel free to contact MacTech Magazine Customer Service at 877-MACTECH

We love to hear from you! Please feel free to contact us with any suggestions or questions at any time.

Write to letters@mactech.com or editorial@mactech.com as appropriate.

MACTECH®

The Journal of Macintosh Technology

A publication of XPLAIN CORPORATION

The Editorial Staff

Publisher & Editor-in-Chief: Neil Ticktin
Executive Editor: Edward R. Marczak
Editor-at-Large: Dave Mark
Business Editor: Andrea Sniderman
Editor-at-Large, Open Source: Dean Shavit
Managing Editor: Dennis Bower
Production Designer: Phillip Gago
Copy Editor: Marianne Shilpa Jacobie
Staff Writer: Dharmendra Rai

Xplain Corporation Senior Staff

Chief Executive Officer: Neil Ticktin
President: Andrea J. Sniderman
Accounting: Marcie Moriarty
Customer Relations: Susan Pomrantz
Board of Advisors: Steven Geller, Alan Carsrud

Regular Columnists

QuickTime ToolKit: by Tim Monroe
Patch Panel: by John C. Welch
The Source Hound: by Dean Shavit
Reviews/KoolTools: by Michael R. Harvey
AppleScript Essentials: by Ben Waldie
Mac In The Shell: by Ed Marczak

Board of Advisors

Chairman: Dave Mark,
Jordan Dea-Mattson, Steven Geller, Bruce Friedman, and Richard Kimes

Contributing Editors

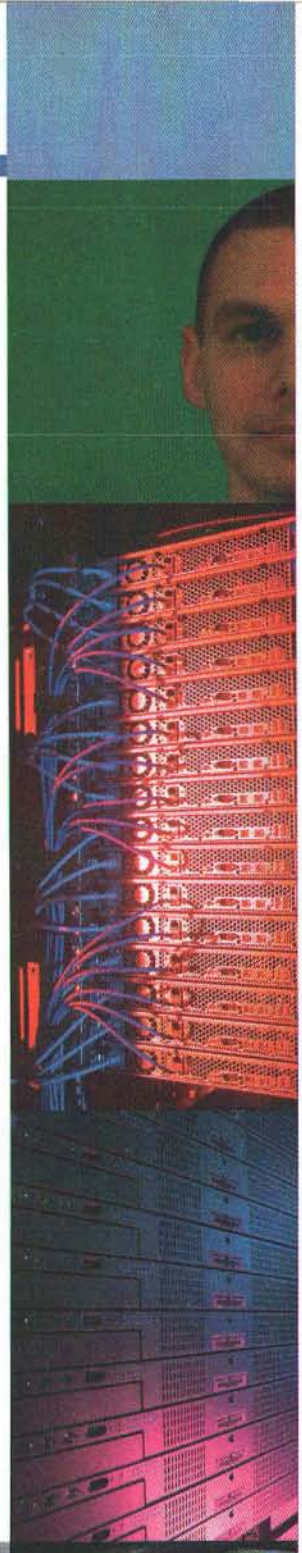
Michael Brian Bentley, Gordon Garb, Vicki Brown, Chris Kilbourn
Marshall Clow, Rich Morin, Will Porter, Tom Djajadiningrat, Avi Rappoport,
Andrew S. Downs, Cal Simone, Steve Sisak

MacTech Magazine (ISSN: 1067-8360 / USPS: 010-227) is published monthly by Xplain Corporation, 850-P Hampshire Road, Westlake Village, CA 91361-2800. Voice: 805/494-9797, FAX: 805/494-9798. Domestic subscription rates are $47.00 per year. Canadian subscriptions are $59.00 per year. All other international subscriptions are $97.00 per year. Domestic source code disk subscriptions are $77 per year. All international disk subscriptions are $97.00 a year. Please remit in U.S. funds only. Periodical postage is paid at Thousand Oaks, CA and at additional mailing office.

POSTMASTER: Send address changes to **MacTech Magazine**, P.O. Box 5200, Westlake Village, CA 91359-5200.

All contents are Copyright 1984-2007 by Xplain Corporation. All rights reserved. MacTech and Developer Depot are registered trademarks of Xplain Corporation. RadGad, Useful Gifts and Gadgets, Xplain, DevDepot, Depot, The Depot, Depot Store, Video Depot, Movie Depot, Palm Depot, Game Depot, Flashlight Depot, Explain It, MacDev-1, THINK Reference, NetProfessional, NetProLive, JavaTech, WebTech, BeTech, LinuxTech, MacTech Central and the MacTutorMan are trademarks or service marks of Xplain Corporation. Sprocket is a registered trademark of eSprocket Corporation. Other trademarks and copyrights appearing in this printing or software remain the property of their respective holders.

From the Editor



Happy New Year, 2007, and Happy MacWorld! The New Year is always an interesting time. Some use it as a time to start new projects and make a break from the old. Others use it as a time to recount traditions and ground themselves with the familiar. We have both for you!

I'm really happy to announce a new feature of MacTech: **The MacTech Spotlight**. Every month, we'll introduce you to someone in the Mac community that is living the dream: making their livelihood by using a Mac! Or, it may be someone that has impacted the Mac community in a positive way. Like our first-ever entry: **Christoph Nadig** and **Pascal Freiburghaus**, aka **Lobotomo Software**. You may have used their IPSecuritas application to setup an IPSec VPN, or, used something else that they've created. Enough here; find out more on the back page, where you'll find The MacTech Spotlight from now on.

My "automate everything" mantra is expounded on in the biggest way possible: Automate the real world, thanks to **Andrew Turner**. Andrew brings us part 1 of a two-part series on using your Mac to provide home automation – or any kind of real world automation in "**Automate Your Place**."

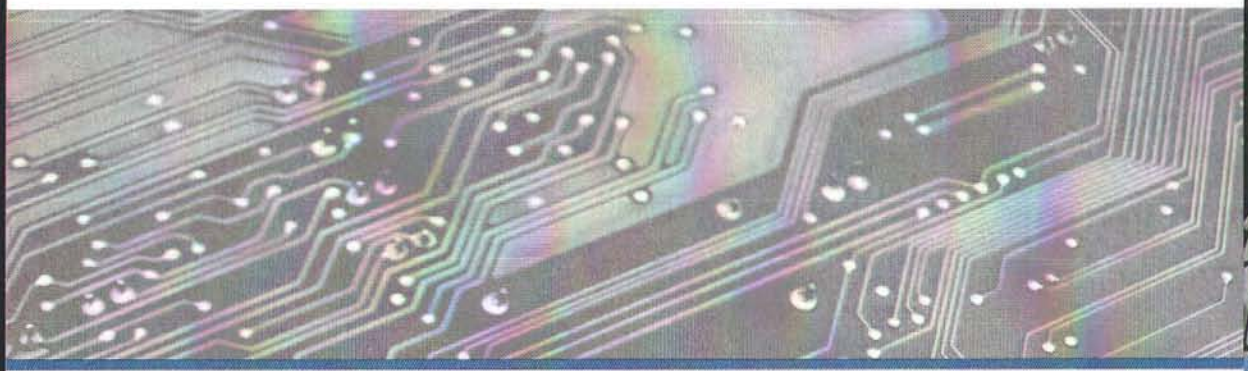
You frequently see mention on a mailing list that someone thinks RAID will provide them backup. Of course, there are immediate cries that, "RAID is not backup!!!" Or, could it be? **Tim Standing**, VP of development for **SoftRAID,** explores how RAID can be part of an overall backup strategy in "**RAID as Backup**." If you're reading this at MacWorld, you can visit Tim at the SoftRAID booth (and I recommend you do).

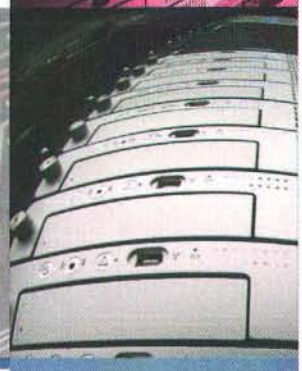
Readers of "**Mac in the Enterprise**," take heart: while the authors of that column have run into some issues, it will be returning soon.

Of course, in addition to the articles above, we have: **Ben Waldie's** AppleScripting column, Mac in the Shell, more from **José Cruz** on customizing XCode in "**XCode Menu Scripts**", Kool Tools reviews, a lesson in Ethernet's **Jumbo Frames** from **Steve Modica**, and an interesting article from **Mihalis Tsoukalos** on **R**, a statistics language that you can apply to tasks that perhaps you didn't think of before. Whew!

Thank you for letting MacTech be one of your technology guides. Have a prosperous 2007!

By Edward Maczak

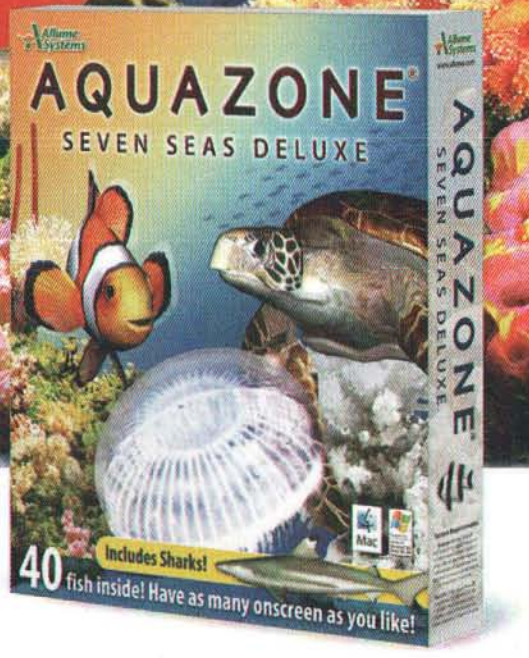




YOUR ULTIMATE 3D AQUARIUM!

NEW RELEASE!

FORTY BEAUTIFUL FISHES,
TURTLES, JELLIES, & SHARKS!
INTERACTIVE SCREENSAVER
TAP THE GLASS, FEED THE FISH



Allume Systems
A Division of Smith Micro Software

A virtual aquarium so vibrant, you'll swear the fish are real! Available from your favorite retailers and catalogs.

Aquazone Seven Seas Deluxe includes 40 fresh and saltwater fish, jellyfish, adult and baby sea turtles, and sharks! Have entire schools of fish on screen swimming through 20 customizable 3D tanks!

® TM, and © 2005 Allume Systems, Inc. To learn more about our range of software solutions for your Macintosh, please visit us at **www.allume.com.**

by Benjamin S. Waldie

Introduction to Scripting Microsoft Word

Lately, there has been a lot of talk in the Macintosh community about Microsoft, and the forthcoming Office 12. One of Microsoft's big announcements is that they will be doing away with support for creating and running Visual Basic macros in the next version of Office. This leaves many people wondering how they will go about automating their Office applications. AppleScript to the rescue. I'm pleased to say that Entourage, Excel, PowerPoint, and Word are all AppleScriptable.

Office has supported AppleScript for some time now, and with the release of Office 11 in 2004, Microsoft actually completely re-implemented much of their AppleScript support, and also added AppleScript support for PowerPoint. Due to these changes, much of the AppleScript terminology in Word and Excel changed from previous versions. If you are currently using Office AppleScripts with a pre-2004 version of Office, then please be aware that you will probably need to make some modifications to your scripts when you decide to upgrade your Office suite. Of course, this should go without saying when upgrading any scriptable application. Any time any application is updated, AppleScript terminology changes may be introduced. This is why it is always a good idea to test your existing scripts with any new application version before implementing it into your live workflow.

This month, we're going to take a look at scripting Microsoft Word. We'll walk through some basic techniques for interacting with Word documents, and the content within those documents. Please note that all code in this month's column was written for and tested with Office 11 (2004). Therefore, if you're using a different version of Office, please be aware that the terminology you need to use may differ from that which I have used.

Working with Documents

Making a Document

Making a new Word document is relatively straightforward. To make a new Word document, simply use the **make** command, as demonstrated here.

```
tell application "Microsoft Word"
  make new document
end tell
-> document "Document1" of application "Microsoft Word"
```

Notice that the result of the **make** command is a reference to the newly created document. This reference may be placed into a variable, if desired, for future reference in your script.

Closing a Document

Closing a Word document is also pretty straightforward. To close a Word document, use the **close** command. Optionally, you may specify a constant value (**yes**, **no**, or **ask**) for the **close** command's saving parameter, to indicate whether the document being closed should be saved. The following example code will close a document without saving it.

```
tell application "Microsoft Word"
  close document 1 saving no
end tell
```

Opening a Document

To open a Word document, use the **open** command, followed by a reference to the document file you wish to open. The following example code will prompt the user to select a Word document file. It will then open that file.

```
set theDocFile to choose file with prompt "Please select a
Word document file:"
tell application "Microsoft Word"
  open theDocFile
end tell
```

Please note that, in the example above, no result is returned by the **open** command. Since you will typically want your script to perform additional tasks on the newly opened document, you will need a way of referencing the document. There are a number of ways that this can be done. Assuming you know the name of the document, one way to do this is to retrieve a reference to the document using its name. For example:

```
set theDocFile to choose file with prompt "Please select a
Word document file:"
set theDocName to name of (info for theDocFile)
tell application "Microsoft Word"
  open theDocFile
  set theDocument to document theDocName
end tell
-> document "My Document.doc" of application "Microsoft Word"
```

If you're sure that the target document will be in the front, then another way you can reference it is by referencing the **active document** application property. For example:

```
set theDocFile to choose file with prompt "Please select a
Word document file:"
tell application "Microsoft Word"
  open theDocFile
  set theDocument to active document
end tell
-> active document of application "Microsoft Word"
```

Premium

Small Business Management & Accounting

Software

Mind Your Own Business. Smarter.

800.322.MYOB (6962)

www.myob-us.com

MYOB and the MYOB logo are registered trademarks of MYOB Technology Proprietary Limited.

Take note that the result of the code above is a reference to the active document. This may work fine in most cases. However, be aware that, since it is not referencing a specific document, if another document is brought to the front, then the incorrect document may be targeted.

It's also important to note is that, in Word, documents have an index number. However, this number does not indicate the front to back position of the document, as it often does in many other applications. Instead, it indicates the document's position, in the order that the documents were opened. In other words, if a document in the back was the last document to be opened, then the front document will not be `document 1`. For this reason, when you want to target the front document in Word, it's always good practice to reference the `active document`.

We have discussed a couple of ways to retrieve a reference to a newly opened document. There are others, some of which are more robust, and I would encourage you to see if you can come up with some ways of doing this on your own.

Saving a Document

Saving a previously saved document into its original location is as simple as using the `save` command, as demonstrated here.

```
tell application "Microsoft Word"
  save active document
end tell
```

However, suppose you want to save a document into a specific location, or in a different format? This is done using Word's `save as` command. This command has several optional parameters, which will allow you to specify the output location, format, and more. To save a document into a specific location, make use of the `file name` parameter, as follows:

```
set theOutputPath to (path to desktop folder as string) & "My
Saved Doc.doc"
tell application "Microsoft Word"
  save as active document file name theOutputPath
end tell
```

To specify a format for the saved document, use the `file format` parameter. For example, the following code will save a document in RTF format:

```
set theOutputPath to (path to desktop folder as string) & "My
Saved Doc.rtf"
tell application "Microsoft Word"
  save as active document file name theOutputPath file
format format rtf
end tell
```

There are numerous other formats in which you can save a Word document, including Word template, HTML, web archive, and more. A complete list of supported formats can be found in Word's AppleScript dictionary, under the `save as` command.

Working with Document Text

Working with Text Ranges

In a Word document, text is typically referenced using text ranges. A text range is a class of object that refers to a specific area of text, such as a single character, word, or paragraph, or all of the text within the document. Each text range has a starting and ending position. For example, a text range might represent character 1 through character 5 of the document. The position 0 represents the absolute beginning of a document, just before the first character, so if you wanted to reference the first 5 characters of a document, the text range would actually begin at position 0, and end at position 5.

To reference text within a Word document, you must first create a text range. This is done by using the `create range` command. This command simply creates a reference for you, to the specified text content. Here's an example:

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 5
  end tell
end tell
-> text range id «data iWrg0000000000000005» of active
document of application "Microsoft Word"
```

The result of the code above is a reference to a range of text within my document, in this case, characters 1 through 5. I can now access attributes of this text by referencing the range. For example, the following code will get the text content within the range:

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 5
    content of theRange
  end tell
end tell
-> "APPLE"
```

Getting the Entire Content of a Document

In Word, the `document` class possesses a `text object` property. This property references a text range representing the entire content of the document. For example:

```
tell application "Microsoft Word"
  tell active document
    content of text object
  end tell
end tell
-> "APPLESCRIPT ESSENTIALS
    Introduction to Scripting Microsoft Word
    Copyright 2007 by Ben Waldie...
```

Adding Text to a Document

To replace text in a Word document, create a text range representing the text to be replaced. Then set the `content` property of that range to the desired text. For example:

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 5
    set content of theRange to "TEST"
  end tell
end tell
```

Another way that text can be added to a document is by inserting it. This is done by using the `insert` command. This command has a required parameter, `text`, which indicates the text to be inserted. It also has an optional parameter, `at`, which can be used to indicate the location before which the text

"Checked in" tells you nothing.

Your configuration management tool should tell you more.

New Surround SCM 5 does.

Seapine

Surround SCM® 5

Software Configuration Management

New Surround SCM 5 with change automation and custom metadata gives you more control over your software change process and a clearer view of the state of files.

Know whether a file you are including in the build has been code reviewed. Ensure design documents have been through the review process. Control who can make changes to files after they have been approved.

Surround SCM 5's virtual branches and collaboration features help streamline parallel development. There's never been a better time to change to Surround SCM—the next evolution in SCM.

- Create workflows to ensure changes to files follow your processes.
- See beyond "Checked in" to know the true status of files in the change process.
- Automate the development process with powerful in-application triggers.
- Improve security with single sign-on support.
- Integrate seamlessly with TestTrack and other popular development and build tools.
- Streamline communication with automated change notifications and flexible reporting.

Seapine ALM Solutions:

TestTrack Pro
Issue & Defect Management

TestTrack TCM
Test Case Planning & Tracking

Surround SCM
Configuration Management

QA Wizard
Automated Functional Testing

Download your **FREE** fully functional evaluation software now at **www.seapine.com/mtsscm5** or call 1-888-683-6456.

Seapine Software®

©2007 Seapine Software, Inc. Seapine Surround SCM and the Seapine logo are trademarks of Seapine Software, Inc. All Rights Reserved.

should be inserted. For example, the following code will insert the text TEST at the beginning of the active document.

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 0
    insert text "TEST" at theRange
  end tell
end tell
```

This same task could also have been accomplished by setting the `content` property of a range representing the beginning of the document to the specified text. For example:

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 0
    set content of theRange to "TEST"
  end tell
end tell
```

Working with Other Content

It's also possible to add other types of elements besides text into Word documents via scripting. For example, you might want to insert a hyperlink, or an image.

Adding a Hyperlink to a Document

To add a hyperlink to a document, use the `make` command to create a `hyperlink object`. In doing so, you may specify property values for the hyperlink, including the text to be displayed the link URL, and the text range representing the location where the hyperlink should be created. For example, the following code will create a hyperlink to my company's website at the beginning of the active document.

```
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 0
    make new hyperlink object at end with properties {text
to display:"Automated Workflows, LLC", hyperlink
address:"http://www.automatedworkflows.com", text
object:theRange}
  end tell
end tell
-> hyperlink object "http://www.automatedworkflows.com" of
active document of application "Microsoft Word"
```

Adding a Picture to a Document

Adding an inline picture to a document is similar to adding a hyperlink. Again, use the `make` command, but this time create an `inline picture`, rather than a `hyperlink object`. When using this command, you may specify property values for the picture, including the `file name` property, which should include the path of the picture file to be inserted (as a string). For example, the following code will create a new inline picture at the beginning of the active document.

```
set thePicturePath to choose file with prompt "Please select
a picture to insert:"
tell application "Microsoft Word"
  tell active document
    set theRange to create range start 0 end 0
    make new inline picture at theRange with properties
{file name:thePicturePath as string}
  end tell
end tell
-> inline picture 1 of text range id «data
iWrg0000000000000000» of document "Document1" of application
"Microsoft Word"
```

In Closing

Now that we have discussed some basic interaction with Word, where do you go from here? We have really only scratched the surface, and there's a lot more that can be done. Take some time to explore modifying attributes of text, such as the font, point size, and color. Explore modifying document properties, adjusting header and footer content, inserting a table of contents, and much more. Take some time to explore Word's AppleScript dictionary. You will find that it contains quite a lot of terminology, so it may actually take some time to become familiar and comfortable with it.

For additional help getting started with Word, be sure to review the Microsoft Word 2004 AppleScript Reference documentation. This documentation can be obtained in the Resources > Development Center > AppleScript Resources for Office 2004 section of Microsoft's Mactopia website at http://www.microsoft.com/mac/. You may also want to explore MacScripter.net's ScriptBuilders, at http://scriptbuilders.net/, where you will find some AppleScripts for Microsoft Word, some of which may even be editable!

Until next time, keep scripting!

About The Author

Ben Waldie is the author of the best selling books "AppleScripting the Finder" and the "Mac OS X Technology Guide to Automator", available from <http://www.spiderworks.com>, as well as an AppleScript Training CD, available from <http://www.vtc.com>. Ben is also president of Automated Workflows, LLC, a company specializing in AppleScript and workflow automation consulting. For years, Ben has developed professional AppleScript-based solutions for businesses including Adobe, Apple, NASA, PC World, and TV Guide. For more information about Ben, please visit <http://www.automatedworkflows.com>, or email Ben at <ben@automatedworkflows.com>.

MACTECH

Visit mactech.com for the latest macintosh technical information.

He's busy doing a software update on 1,037 computers.

Hard to tell though, isn't it? That's because he's automating it using FileWave® software. Totally cross-platform, totally automated. So, are you an IT administrator? Tired of manually installing OS updates, security updates and patches? Or maybe you just aren't keeping your software up to date? Automate it with FileWave® and save time for the important things.

Hundreds of satisfied customers agree: FileWave® just works.

FILEWAVE®

www.filewave.com

"We can do all updates via FileWave® with 99.9% success (you wouldn't believe me if I had said 100%)"

– David Zubradt, FileWave Administrator for a leading US cable television corporation.

"I was skeptical of the FileWave® product because it seemed too easy and too good to be true. After piloting the product for two months on PC's and Mac's, we ordered 4,400 clients because it worked that well. I love having the ability to manage software on both platforms from one console. FileWave® allows our technology staff to focus on other responsibilities while it deploys, repairs, and removes software. FileWave® is the single best purchase with the most "bang for the buck" I have seen in years. I couldn't be more pleased with the product."

– Mike Kneebone, North Central High School, Indianapolis"

Can RAID be used for Backup?

Try splitting off a RAID drive as part of a backup strategy.

By Tim Standing

Introduction

It's 4:30 PM on a Friday and you get a call that a server you administer is down. The users are going to be working through the weekend on a project which is due on Monday and are getting frantic because many of the files they need are on the server. This is the time when you'll see whether the backup of that server is any good. The two criteria which matter to your users are: 1) How fast can you get the server back online and 2) How old are the files you are restoring. These two items will determine whether the users think you are a miracle worker or just someone who tinkers with computers. This article describes how you can use mirror volumes (RAID 1), as part of a backup strategy which can get your users to think of you as a miracle worker.

What is Backup?

Before I get in trouble with the semanticists reading this article, I need to define what I mean by "backup." For this article, I define backup as the process of protecting files or volumes from any disaster which can destroy data. This includes: a hard disk failing, a user accidentally deleting a file, theft of a laptop, a file system getting corrupted, a virus infection, or your place of business burning to the ground (can you tell I'm a volunteer fire fighter).

For me, a backup does not include saving multiple copies of a given file or volume for several years or saving copies of all the work you've ever done; I call that archiving. If you need to maintain an audit trail for financial or legal reasons or if you want to create an offline library of all the work you have ever created, you need some method of archiving your files. You should use software which allows you to archive to tape, for long term storage or simply copy files to CD-R or DVD-R media. In either case, the media should be stored in a safe deposit box at the bank or offsite in a fireproof vault.

Traditional uses for Mirror Volumes

Most people think of mirror volumes as providing protection only from disk failures. This is the "set it and forget it" attitude to RAID; you set up the mirror volume with two disks and don't touch it until one of the disks fails. At that point, the other disk provides data protection because your files are redundantly stored on it.

The problem with the "set it and forget it" approach to mirror volumes is that it only protects you from one of the data disasters listed above: hard disk failure. If you accidentally delete a file, the file is deleted from both disks. If your mirror volume's file system becomes corrupted, the corruption is written to both disks. Likewise if your building burns down or your Mac is stolen, you have no backup copy of your data to continue your business with. These are the reasons many people think that RAID cannot be part of a good backup solution.

Backup Strategies which use Mirror Volumes

Let's start by reviewing some of the features of a mirror volume. Once the volume is set up, every write goes to all the disks in the volume. Therefore, every disk contains exactly the same data; if the volume is bootable, every disk in the volume is bootable. At a later date, if a disk is added to the volume, a rebuild is started. This involves reading every byte of the volume and writing it to the new disk. Since this occurs at a layer under the file system, the copying is unaffected by whether a file is open, currently being written to or locked by one of the users. At the end of the rebuild, all of the bytes on the newly added disk are identical to the bytes on all the other disks in the volume. This ensures that this new disk contains the intact copy volume, with the correct permissions, modification dates, boot data structures etc. After the rebuild completes, writes to the volume continue to go to the new disk as well as all the other disks in the mirror volume, ensuring that the new disk continues to contain an accurate copy of the volume's data.

So how can we use the fact that a RAID 1 volume has identical data on two or more disks as the cornerstone of a disk to disk backup strategy? As soon as you remove one of the disks from the mirror volume, that disk becomes a backup copy of the entire volume. It is an instantaneous snapshot of all the data on that volume taken at the moment the disk is disconnected. If something happens to the original volume, you can always attach the backup disk to another computer and mount the copy of your mirror volume. In SoftRAID, we call the main disk of a

mirror volume, the primary disk and all the others are referred to as secondary disks. I will use this terminology for the rest of this article.

Let's look at a couple of ways that people are using mirror volumes for backup and, what it protects them from.

The Laptop User:

First let's look at a laptop user who travels a lot. She is out of the office most of the week and returns every couple of days to attend meetings and work with the creative personnel to develop new ideas for clients. She has set up her startup volume as a mirror with the internal disk in her laptop as the primary disk and, an external FireWire disk as a secondary disk. Every time she comes back to the office, she plugs in her secondary disk. The mirror volume starts a rebuild which copies all data from her primary disk to her secondary disk. She can continue to use her laptop as the rebuild is in progress. (The SoftRAID driver minimizes the performance degradation during a rebuild by only copying bytes when the volume is not being accessed.) When the rebuild is done, she can unplug her secondary disk and leave the office on another trip.

If anything happens to her laptop when she is on the road, it gets stolen or someone spills coffee on it, she is confident that she can get back to work as soon as she returns to the office. All she has to do is attach the secondary disk to a new computer and boot up holding down the option key. She can then select the secondary disk as her startup disk and boot up using a copy of the volume which was on her original laptop. The only data she will have lost are those changes which she made since she last connected her secondary disk.

There are several advantages to this backup method, compared to backup strategies which don't involve RAID: the secondary disk is guaranteed to be bootable if the volume is bootable, the backup can take place regardless of which files are open or in use, the backup has very little impact on the performance of the Mac (usually less than 1% of the CPU capacity when a rebuild is in progress), and there is no restore operation required before the backup can be used.

The Desktop Mac User:

The second user I want to look at is the professional who relies on his desktop Mac for his business. He is a lawyer, developer, architect or other professional whose business relies totally on the contents of his computer. If he loses the files on his computer, his business will really suffer. In addition, the time lost when dealing with a failed hard disk is money down the drain. This user relies on a three disk mirror volume. His Mac has two internal SATA disks which are used as the primary and secondary disks of a mirror volume. If one of the disks fails at any given point, the other one will take over and become the new primary disk, so his files are always protected from a hard disk failure. The third disk is an external FireWire disk which is also a secondary disk. It is stored offsite (either at home in a fireproof safe or at another safe location). Every Friday, he brings this third disk into his office and connects it to his desktop Mac. Once this disk is connected, a mirror rebuild starts automatically. He can perform this rebuild as he continues to use his Mac during the day. At the end of the day, when he shuts his Mac down, he disconnects his external secondary disk and returns it to its offsite location. This offsite secondary disk becomes his insurance against his building getting broken into or his building burning down. Like the laptop user, if his Mac gets destroyed, he can just purchase a replacement Mac and then boot up from his external secondary disk. At most, he will use one week's worth of work.

The Server administrator:

The last user I want to look at is a server administrator, running a mail server on a XServe. She can't afford to have the server go down due to a disk failure so she is also using a mirror volume with two internal disks. She also can't afford to lose a week's worth of mail, so she has chosen a more aggressive backup strategy than the professional user. Her solution is a mirror volume with 4 disks, 2 internal, and 2 external FireWire disks. The two external secondary disks are normally stored offsite in a secure location. Every morning, the FireWire disk which contains the oldest copy of the volume is attached to the server and the mirror rebuild starts. Once the mirror rebuild has completed a few hours later, the external secondary disk is returned to its safe offsite location. This ensures that at least one copy of the data on the mirror volume is always at a secure offsite location.

There is a SoftRAID user in the military who has 8 external disks and performs his daily server volume backup by using these 8 disks in rotation. This allows him to restore his server volume to any state it was in, during the last 8 days.

Features in SoftRAID which facilitate backups

SoftRAID, LLC, had users of its Mac OS 9 product who were using SoftRAID for backing up their servers. We found out how they were doing their backups and listened to their requests for new features. These features were: the ability to make write protected copies of a mirror volume, and a mechanism to regulate the speed of a mirror rebuild. These requested features are designed to facilitate disk-to-disk and disk-to-disk-to-tape backups. They have been incorporated into SoftRAID 3 for Mac OS X.

SoftRAID 3 allows users to split a secondary disk off of a mirror volume as a read only copy of the volume; called a "Read-Only Secondary" volume. These disks then mount on the desktop as separate volumes which are write protected by the SoftRAID driver. Read-Only Secondary volumes are the most secure form of disk to disk backup as the user cannot modify these volumes once they are split from the original mirror volume. At a later date, the user can choose either: to add these Read-Only Secondary volumes back to the original mirror volume or to convert them to normal read/write volumes.

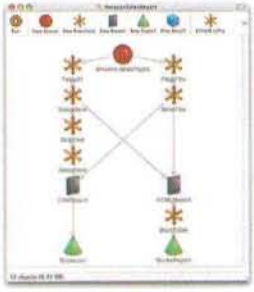
Web Mining Case Study #104:
from metafy.com

Anthracite™
web mining desktop toolkit

Build valuable web data processing systems with drag and drop simplicity.

"I set up a 'bot in considerably less time than it would take to write a script, and without ever reading the documentation. Anthracite lets you use the web in new and time-saving ways with very little effort." Gordon Meyer
O'Reilly Author
Smart Home Hacks

AUTOMATES MONITORING BOOK SALES INFORMATION



1. *LOAD WEB PAGES*
   Anthracite reads pages from book sales service.
2. *EXTRACT SPECIFIC DATA*
   Various processors get just the desired information.
3. *REFORMAT & EXPORT*
   The data is formatted as HTML and CSV then saved.

Anthracite is a web spidering and scraping power toolbox. Automate data collection, processing, reporting and even database exporting without having to write any code. (Scripting just makes it more powerful!)

Thousands of Uses, Only $99
Comes with Ready-To-Run Sample Solutions

Download the Free Two Week Trial Now!

For Apple Mac OS X Only, Universal Binary

Contact mactech@metafy.com
for Pre-Sales Support & Reader Discount!

http://www.metafy.com

© 2006 Metafy LLC

SoftRAID 3 also allows the user to determine how a given volume will be used; called the volume optimization setting. This setting determines how much of the disk bandwidth the SoftRAID driver will use during a mirror rebuild. The possible settings are: Server - uses the disks as much as possible, Workstation - uses the disk 50% of the time, and Digital Audio or Digital Video - waits for many seconds of inactivity on the volume before performing any i/o for a mirror rebuild.

Putting Theory into Practice

Let's see how to setup a mirror startup volume for each of these users. I will be illustrating this by describing the steps you perform with the SoftRAID application. You can perform some of these steps with AppleRAID, the RAID software build into Mac OS X, but you will have to resort to using terminal to run the diskutil tool.

Since a mirror volume is just a volume with the identical data on more than one disk, it is easy to convert a standard Apple Disk Utility non-RAID volume into a SoftRAID mirror without erasing any of the files on the volume. The only changes which need to take place are: the volume's partition needs to be changed to a SoftRAID partition, and a small SoftRAID specific partition must be created to contain the volume's metadata. The SoftRAID application performs these steps with one menu selection.

For security reasons, Mac OS X will not allow a disk's partition map to be modified if the disk contains mounted volumes. This means that all the volumes on a disk must be unmounted before the partition map can be changed. If the volume is not your startup volume, this is easy; the SoftRAID application can just unmount the volume, change the partition map, and then remount the volume. If the disk contains your startup volume, you have to start up your Mac using a different startup volume (e.g.: the SoftRAID Startup CD or a volume on an external FireWire disk). Once the partition map has been changed, all the other steps of creating and managing a mirror volume can be performed while your Mac has started up this volume.

Setting up a Mirror Volume for the Laptop User:

1) Startup your Mac using the SoftRAID Startup CD. As I described above, you must use a different startup volume than the one on the disk you will be converting to SoftRAID. You can use either the SoftRAID Startup CD (available for purchase from www.softraid.com), use an external FireWire disk which contains a startup volume or startup your laptop in target disk mode and connect it to a second Mac. If you purchase the electronic version of SoftRAID, you will have to use the second or third method for starting up your laptop.

2) Launch the SoftRAID application. If you did not use the SoftRAID Startup CD, you will have to double click on the SoftRAID application to launch it.

3) Convert your startup volume to a SoftRAID volume. Click on the tile for the internal disk in your Mac in the **Disks** column. You will see that it gets connected to a volume tile which represents your startup volume in the **Volumes** column. Select **Convert to SoftRAID 3** in the **Disks** menu to convert your volumes partition to a SoftRAID volume partition. This process does not change any of the files in your volume, and all your volume's data will remain intact.

4) Restart your Mac using your normal startup volume. Restart your Mac, so it is using the original startup volume. This will now be a SoftRAID volume and will have a SoftRAID non-RAID volume icon.

5) Connect the second disk you will be using for the mirror volume. Connect a second disk to your Mac. This disk must be the same size or larger than the internal disk in your laptop. If your Mac contains a PowerPC CPU, you will have to use a FireWire disk as USB disks cannot be used for startup volumes. If you Mac contains an Intel CPU, you can use either a FireWire or USB disk. (Our experience has been that USB disks are much less reliable on Mac OS X than FireWire ones on either type of CPU.)

6) Initialize the second disk. Click on the tile for the external disk you have connected and select **Initialize** from the **Disk** menu. This tells the SoftRAID application to create a partition map on the disk you have selected. You can specify the partition map type to use or let the SoftRAID application choose the appropriate one by using the **Default** button (APM for PowerPC Macs and GPT for Intel Macs). The partition maps for all the disks of a given volume must be the same type.

7) Convert the startup volume to a mirror. Click on the tile for your startup volume and select **Convert to Mirror** in the **Volume** menu. Then select the external disk you have just initialized. This will convert the volume to a mirror volume which contains two disks: the internal as the mirror primary disk and the external as the secondary one. It will also start a rebuild of the mirror volume. The rebuild process copies all of the data on the internal disk to the external one. Since a mirror volume always sends all writes to all the mirror disks, the two disks will contain identical volume data after the rebuild has completed, even if you have written files to the volume during the rebuild process. Both disks will continue to contain identical volume data as you use the volume, as long as they remain connected.

8) Wait for the mirror rebuild to complete. The rebuild will continue even if you quit the SoftRAID application. This is because the rebuild process is actually handled by the SoftRAID driver; the application just displays a progress indicator for the rebuild, and allows you to stop a rebuild which is in progress. Once the rebuild has finished, the driver will display a dialog telling you that the

STOP SHARING!

START FAXING!

Each subscriber receives faxes directly by email as PDF file attachments.

Corporate accounts from 3 to 100+ users available

For more information and a special offer for MacTech readers, visit

www.MaxEmail.com/MacTech

maxemail®

Call: 800-964-2793

mirror volume is in sync, and all the disks contain identical data. The driver also writes an entry to the system.log file when the rebuild completes. You can view the system.log file using the Console application located in the Utilities folder.

Leaving the office with your Laptop:

1) Disconnect the external disk from your laptop. You can either shutdown your laptop, and then disconnect the external disk or disconnect it while your Mac is still running. The external disk becomes a snapshot of your internal volume taken at the exact time the external disk gets disconnected. Note that if you disconnect the external disk while your laptop is asleep, your Mac may hang when you wake it back up. This is due to a bug in the kernel which fails to keep track of external disks correctly if they are removed while the Mac is asleep.

Returning from your trip and reconnecting your second disk:

1) Reconnect the external disk to your laptop. When you return to your office and want to rebuild your mirror, you connect the external disk to your Mac. You can do this before you restart your Mac, when it is asleep or while it's running. When the SoftRAID driver detects this disk, it will recognize it as part of an existing mirror volume, and automatically start a rebuild. It will also display a dialog telling you that it has started the rebuild, and write an entry to the system.log file with the time the rebuild started. Once the rebuild has finished, the driver will display a dialog stating that the mirror volume is in sync, and all the disks contain identical volume data. It will also write another entry to the system.log file. At no point do you have to run the SoftRAID application to complete the rebuild.

Setting up a desktop or server Mac:

The process of converting the startup volume to a mirror for a desktop or server is identical to that of a laptop. For these applications, the first two disks for a mirror volume are probably going to be internal or in the slide out trays in the case of an XServe. Like with the laptop, once the startup disk has been converted to SoftRAID, all of the remaining steps can be performed while the Mac is in use. You can have a server on line and have users logged in ,while you initialize your second disk and convert your startup volume to a mirror.

Adding additional disks to your Mirror Volume:

You can add another disk to your mirror volume at any time. This means you can add disks to your mirror volume as your backup strategy becomes more advanced or as your equipment budget grows. SoftRAID allows you to have up to 16 disks associated with a given volume. (SoftRAID also allows up to 60 volumes per disk, and has been tested with over 100 disks connected to a single Mac.)

To add another disk to a mirror volume:

1) Connect the new disk to your Mac. This disk must be the same size or larger than your mirror volume. For startup volumes, this disk must be on a bus which supports booting (i.e. not USB on a PowerPC Mac). It should also offer similar performance to the other disks in the volume. For instance, adding a FireWire 800 disk to a mirror volume, which contained SATA II disks would be okay, but adding a USB disk to the same volume would impair performance.

2) Launch the SoftRAID application.

3) Initialize this new disk. Click on the tile for the external disk you have connected, and select **Initialize** from the **Disk** menu.

4) Add the disk to your mirror volume. Click on the tile in the Volumes column, which represents your mirror volume. Then select **Add Secondary Disk** from the **Volume** menu. You can then select the newly initialized disk, and it will be added to your mirror volume. It will also start a rebuild of the mirror volume.

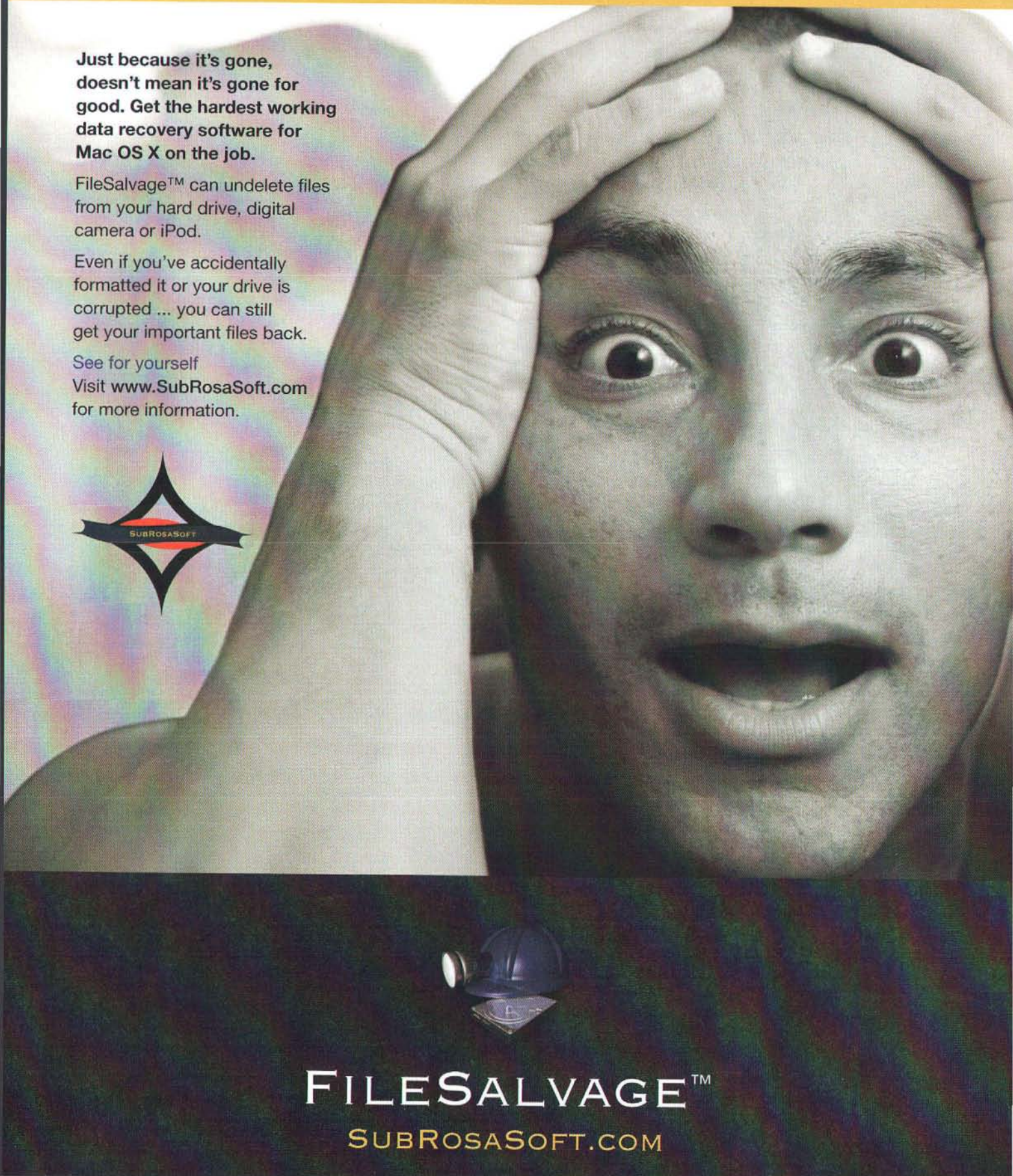
5) Wait for the rebuild to complete. The rebuild will continue even if you quit the SoftRAID application. For faster desktop Macs and servers, a mirror rebuild will take less than 60 minutes for every 100 GB of volume size.

Using Read-Only Secondary Volumes for Offsite Backups

While a disk can simply be unplugged from a mirror volume to create a snapshot of that volume, the most reliable way of creating a copy is to split a disk off as a Read-Only Secondary volume. This creates a write protected copy of the original mirror volume on a single disk. When the disk is connected to another Mac for use with a tape backup system or to recover a group of files, the file system is locked, and none of the files on it can be modified. (The SoftRAID driver actually blocks writes to that volume, so even attempts to write to the volumes partition will fail.) At a later time, the Read-Only Secondary volume can be added back to a mirror volume. When this happens, the SoftRAID driver will start a mirror rebuild to copy all the data from the volume back onto the disk, which has just been reconnected.

The mirror volume on a server could therefore be backed using two or more external disks, both of which were split from the mirror volume to create Read-Only Secondary volumes. Every time a backup was required, the disk with the oldest Read-Only Secondary volume could be reattached and added back to the original mirror volume. This would start a mirror rebuild. Once the rebuild had completed, the disk could be split from the mirror volume as a Read-Only Secondary and stored offsite.

'Poof! Three months of work gone because I hit the wrong key.'



Just because it's gone, doesn't mean it's gone for good. Get the hardest working data recovery software for Mac OS X on the job.

FileSalvage™ can undelete files from your hard drive, digital camera or iPod.

Even if you've accidentally formatted it or your drive is corrupted ... you can still get your important files back.

See for yourself
Visit **www.SubRosaSoft.com** for more information.

SUBROSASOFT

FILESALVAGE™

SUBROSASOFT.COM

SyncDeK

Any Time,
Any Where Data

- **Mobility**: Data delivered any time, anywhere in the world.
- **Synchronize data** between FileMaker databases and now SQL data sources, easily and securely, no matter where they are.
- For offline laptops or online home offices and multiple office locations – each local copy of the database synchronizes its data with the others, **automatically or on demand.**
- SyncDeK **encrypts** all data transmissions.
- SyncDeK works with your databases behind your firewall to **prevent intrusion**, or keeps all database copies completely decentralized.
- Protect mission critical data with SyncDeK's continuous offsite differential **data backup**, warm standby and fail-over servers.
- **Sync servers** with client-free server replication.
- **Version Update Manager** allows you to update all copies of the database without requiring installation or any action on their part.
- **Call for demo, trial and best pricing options.**

WorldSync

877.548.4920 toll-free
510.548.4920 international
www.worldsync.com

To Create a Read-Only Secondary Volume:

1) Launch the SoftRAID application.

2) Spit one of the disks off as a Read-Only Secondary volume. Click on the tile in the Volumes column which represents your mirror volume. Then select Split Mirror from the Volume menu. You can then select the secondary disk you want to use as a backup copy of the mirror volume. Select the Read-Only Secondary option, and then click the Split button. In 5 - 10 seconds, your disk will be split off as a Read-Only Secondary volume.

3) Disconnect the disk containing the Read-Only Secondary volume. You can unmount the Read-Only Secondary volume and disconnect the disk from the Mac. It is now ready to be stored offsite.

To Add a Read-Only Secondary Volume back to the Original Mirror Volume:

1) Attach the disk containing the Read-Only Secondary volume. Connect the backup disk with the Read-Only Secondary disk to your Mac. The volume will automatically mount on the desktop.

2) Launch the SoftRAID application.

3) Add the Read-Only Secondary Volume back to the Original Mirror Volume. Click on the tile in the **Volumes** column which represents the Read-Only Secondary Volume. Then select **Convert Read-Only Secondary Volume** from the **Volume** menu. Use the default setting of **Add back to original Mirror volume,** and click the **Convert** button. The Read-Only Secondary volume will be added to the original mirror volume in 5 - 10 seconds, and a rebuild will be started.

Recovering from Data Disasters:

All of the data disasters you can encounter can be divided into two types: those where you need to restore an entire volume intact, and those where you only need to restore a group of files or folders. When you are restoring an entire volume, you do not have access to the original volume or cannot trust its contents. This would happen if your Mac was stolen or if all of the mirror disks inside your Mac were destroyed by a power spike. You would also want to restore an entire volume if you had a corrupted volume or your Mac was kernel panicking each time you started up.

If you are restoring a group of files or folders from a volume, chances are that the original volume is still fully functional. In this case, you only need to copy a

file or group of files which were accidentally erased to your mirror volume or another safe place.

Recovering an entire volume:

If your backup disk contains a Read-Only Secondary volume, you will have to convert it to a normal volume before you can use it as a startup volume. You can do this using the SoftRAID Startup CD or by connecting it to another Mac, and running the SoftRAID application. To convert a Read-Only Secondary volume to a normal startup volume:

1) Launch the SoftRAID application.

2) Convert the Read-Only Secondary volume to a non-RAID volume. Click on the tile in the **Volumes** column which represents the Read-Only Secondary Volume. Then select **Convert Read-Only Secondary Volume** from the **Volume** menu. Select the **Convert to non-RAID Volume,** and click the **Convert** button. The Read-Only Secondary volume will be converted to a non-RAID volume, and will mount on the desktop.

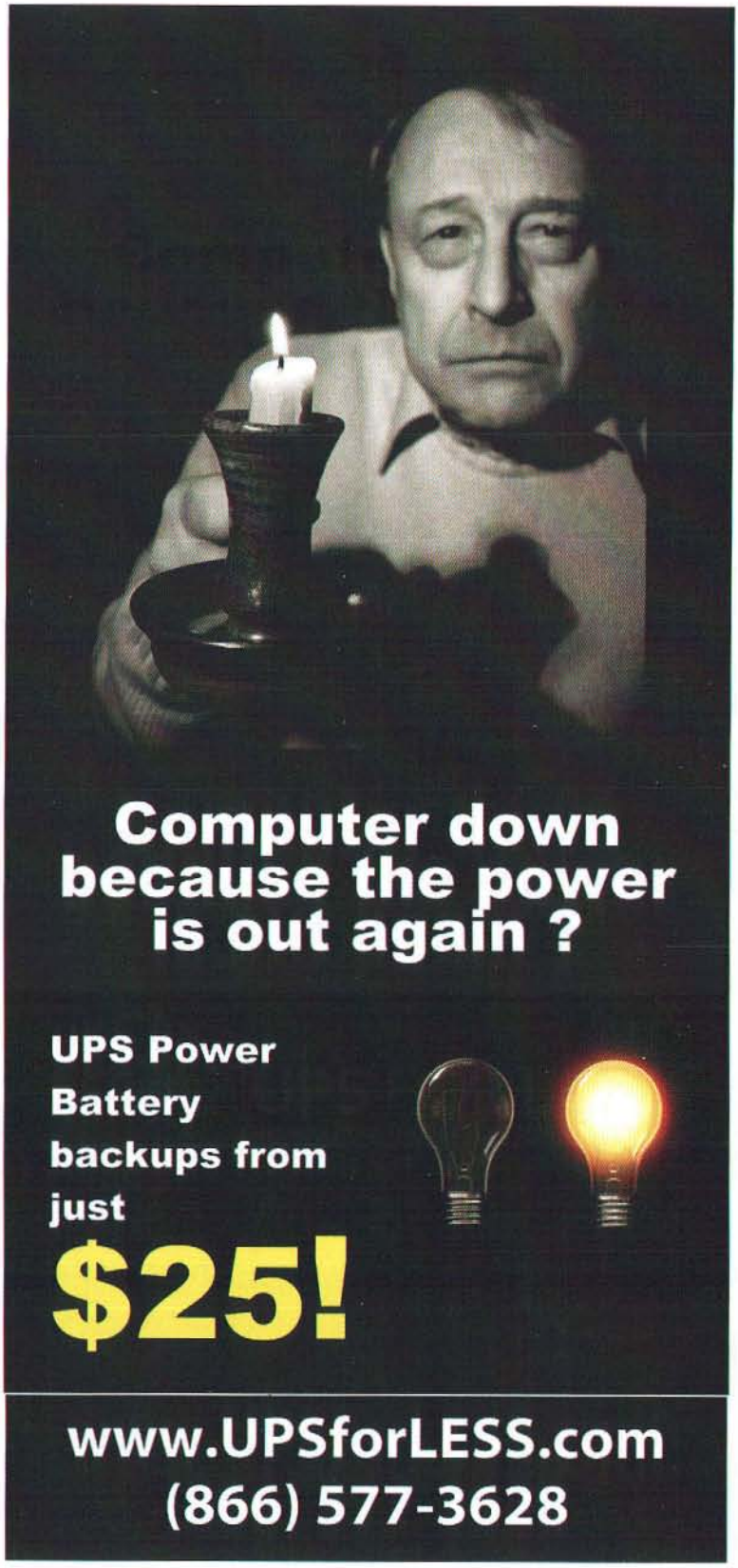
3) Startup the Mac using your backup disk. Attach the backup disk to the replacement Mac you want to use. Then startup the Mac, and select the backup volume as your startup volume.

If your backup disk was simply disconnected from the Mac, and does not contain a Read-Only Secondary volume, you should connect it to different Mac before using it. If you are using the original Mac, you should disconnect all of the original mirror disks or the SoftRAID driver may try and start a mirror rebuild, possibly overwriting your backup of the volume.

To startup using a backup disk which contains a snapshot of the mirror volume:

1) Connect the backup disk to the Mac you want to use. Make sure the replacement Mac you are using can be started up using the partition map type, and Mac OS X version on the backup disk.

2) Disconnect any disks which were part of the mirror volume. Make sure all of the disks which were used with the original mirror volume are disconnected from the Mac. These disks contain copies of the corrupted file system, virus infection or other malady which is causing your Mac to kernel panic. If they are connected when you try and startup from the backup disk, the SoftRAID driver may start a mirror rebuild, possibly overwriting the backup disk with data from the corrupted volume.



3) Startup the Mac using your backup disk. The startup process will take 15 seconds longer than normal, the first time. This delay will occur when you see the grey apple logo. This delay is normal, and is caused by the SoftRAID driver waiting to see if any of the other disks in the mirror volume will appear. If they don't appear in 15 seconds, the SoftRAID driver will use the backup disk for the mirror volume, and start the Mac.

Remember that the usual startup disk rules apply: You can't startup an Intel Mac from a disk with an APM partition map, and similarly you can't start up a PowerPC Mac from a disk with a GPT partition map. In addition, the version of Mac OS on the backup disk must be able to boot the Mac you are trying to startup. So, don't try and startup your new replacement Intel XServe with the backup disk from your G4 XServe, which was running Panther Server.

Recovering a group of files or folders:

If your backup disk contains a Read-Only Secondary volume, you can just connect the disk to your Mac, and copy the files and folders you want off of the volume. The volume will have the same name as your mirror volume, but the icon will have a small paddle lock on it.

If your backup disk was simply disconnected from the Mac, and does not contain a Read-Only Secondary volume, you should connect it to different Mac and copy the files off using this second Mac. If you connect this backup disk to a Mac, which contains the original mirror volume, the SoftRAID driver might start a rebuild which would overwrite the files you are trying to recover.

The Advantages and Disadvantages of using Mirror Volumes for Backup

There are several advantages to using mirror volumes as part of a backup strategy: 1)The backup preserves all permissions, file system links, and aliases perfectly. 2) Open and locked files can be backed up. 3) There is no restore step. 4) It takes less than 5 minutes to get a server back on line from the backup disk. 5) It is easy to see if your backup worked.

There are a few disadvantages to using a mirror volume for a backup: 1)The backup disk must be the same size or larger than the size of the volume. 2) The backup time is dependent on the size of the volume, not the amount of data on the volume.

Recovering the Server on Friday Afternoon:

Let's revisit the scenario I started this article with. If you had backed up this server by creating backup disks containing Read-Only Secondary volumes, you could have the server back up within 10 minutes. The hardest part would be getting a replacement Mac, the backup disk, and the necessary cables together. All you would do is convert the Read-Only Secondary volume to a non-RAID volume, and then set it to be the startup volume on your replacement Mac. You would then have a server which was exactly the same as the original server (at the time you created the backup).

If you had backed up that server with a more traditional type of backup software, how far into the restore process would you be in 10 minutes?

Conclusion

This article showed you viable ways to make RAID a part of your overall backup strategy. While its original use concerned high-availability, being able to split off an in sync mirror volume opens up a new avenue of data protection.

About The Author

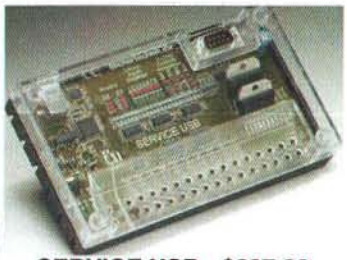
Tim Standing is the Vice President of Engineering for SoftRAID. Outside of writing code, he spends time with his family, and as a volunteer fireman

Control real-world devices

from your Mac with a wide variety of standard applications and programming languages such as:

- REALbasic
- AppleScript
- Runtime Revolution
- FileMaker
- Ragtime
- Xcode
- C/C++
- Cocoa
- Java
- CodeWarrior
- Carbon
- MaxMSP
- LabView
- DirectorMX
- 4th Dimension
- and the UNIX-Shell

SERVICE USB plus · $465.48



SERVICE USB · $297.80

Simply buy one interface from the SERVICE USB series and control motors, lamps, relays. Log values like temperature, pressure or brightness. Get the status of switches, light barriers or reed-contacts.

Custom made models, USB-POS accessories and special electronics are also available.

All interfaces ships with a complete SDK, drivers, sample apps and documentation.

Well suited pre- and after sales eMail-support is available as a matter of course.

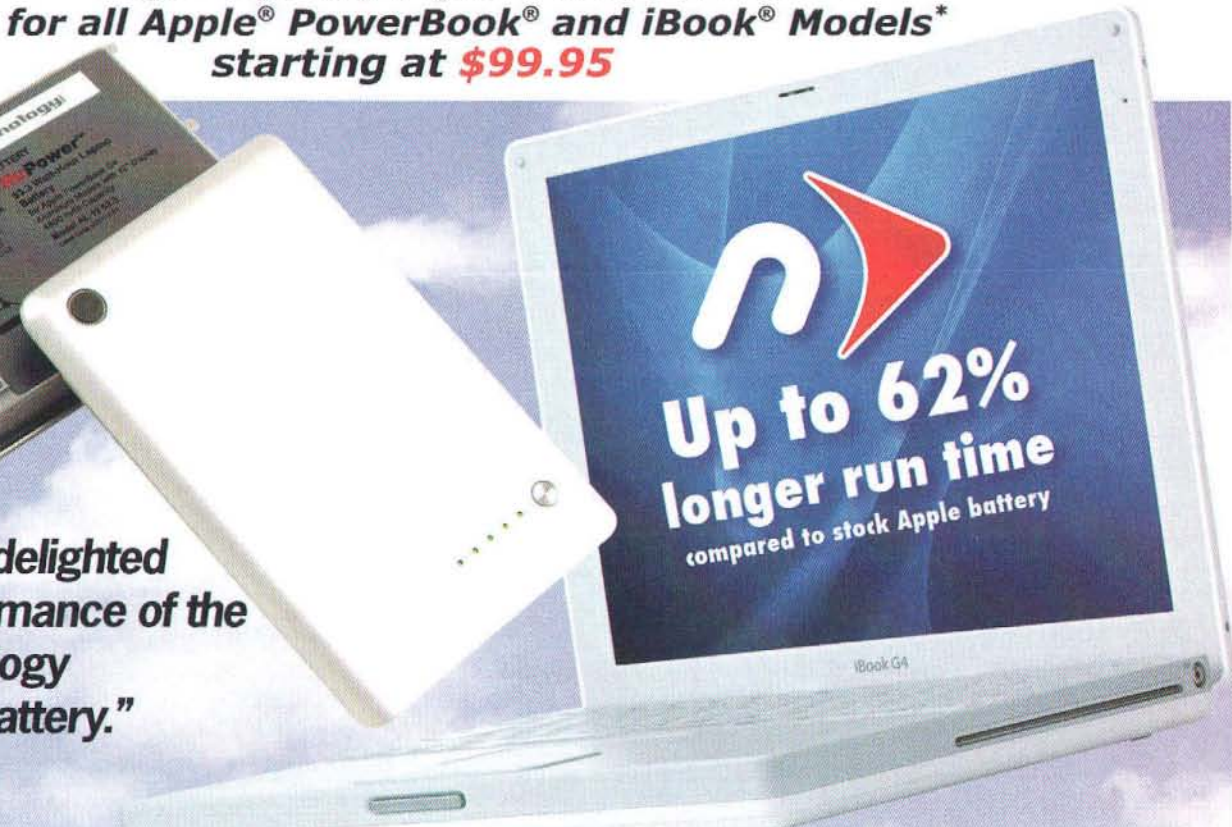
www.bkohg.com/products.html

Bönig and Kallenbach - GERMAN TECHNOLOGY

Experience The Difference NuPower®

newertech® NuPower

High Capacity replacement batteries for all Apple® PowerBook® and iBook® Models* starting at $99.95



"...completely delighted with the performance of the Newer Technology replacement battery."
- MacOpinion.com

- Advanced Li-Ion Polymer cell technology
- Unrivaled quality and performance
- Unmatched longest run times
- Free battery recycling return label
- 1year NewerTech warranty
- RoHS Compliant**
- Manufactured in the USA

All NewerTech NuPower batteries incorporate Thermal Fuse Technology to protect you and your laptop.

newertechnology inc™

To purchase NewerTech products, visit distributor: **Other World Computing**
at **www.MacSales.com** or **(800) 275-4576**
For a complete list of distributors, visit: **www.NewerTech.com**

*all Powerbook G3 & G4, all iBook G3 and G4 Apple Laptops introduced since 1998
Certain models

Apple, PowerBook, iBook, MacBook, and MacBook Pro are trademarks of Apple Computer Inc. No affiliation is implied or suggested.
NewerTech and NuPower are registered trademarks and the Newer Technology, Inc. logo is a trademark of Newer Technology, Inc.

Xcode Menu Scripts

Creating and installing Xcode menu scripts using Xcode

By Jose R.C. Cruz

Introduction

Xcode is the de facto development environment for the MacOS X platform. Its Interface Builder allows user interfaces to be easily built and linked to the appropriate code. Its use of GCC enables it to support various languages, even exotic ones such as Haskell. Also, its build phase system is much easier to understand and maintain than the more kitchen-sink approach of makefiles.

Another unique feature of Xcode is its Script menu. It allows developers to add scripts that will customize or enhance the Xcode environment. These scripts can perform specific tasks on a selected text or file, or even on the entire project. They can also enable Xcode to interact with other third-party tools.

This article will focus on what constitutes an Xcode menu script. It will demonstrate how to use Xcode to write and install a menu script. It will also provide a number of script examples that developers may find useful. Readers are assumed to have a working knowledge of writing basic shell scripts.

To complement this article, the installer package, XcodeMenu, is available for download from the MacTech website. The package contains the project and file templates that will help readers write their own menu scripts. It also contains the example scripts shown in this article, as well as the Xcode project used to create them. The package can be downloaded at the following URL: «place URL here».

The Xcode Menu Script System

The Script menu is the central launch point for all Xcode menu scripts. Each item on the menu corresponds to a script stored inside the Xcode script directory. The directory itself is located on the OS X boot volume at the following path: `/Library/Application Support/Apple/Developer Tools/Scripts/10-User Scripts`.

Figure 1 shows the structure of the Xcode script directory, and its default contents. Notice that the `10-User Scripts` directory is further subdivided into 6 other subdirectories. Each subdirectory gathers the scripts in terms of their general function. For instance, the `20-Search` subdirectory contains those scripts that perform a search function.

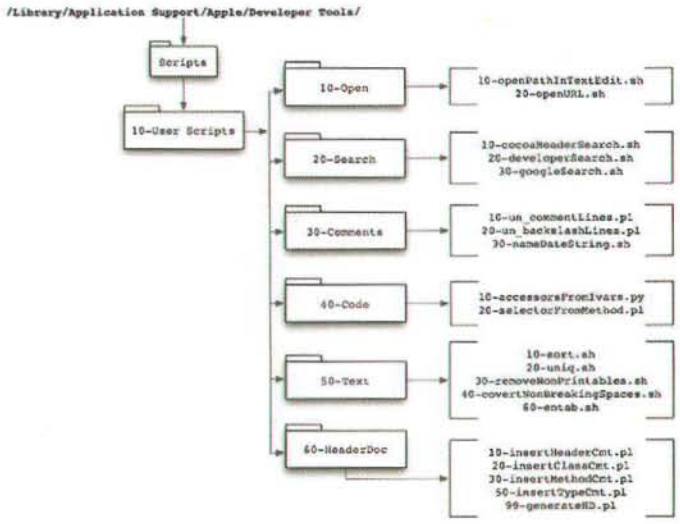


Figure 1. The Xcode script directory.

The numbers before the names of each subdirectory and script show their positions on the Script menu. Each subdirectory is displayed as a submenu of that menu. A menu separator is defined using an empty file whose name consists of a number followed by three dashes. For instance, an empty file with a name of `15---` in the subdirectory `50-Text` places a menu separator between the scripts `10-sort.sh` and `20-uniq.sh`.

Anatomy of a menu script

In many ways, an Xcode menu script is similar to a basic shell script. Both are text files, and both can be written in any one of the popular shell languages such as `sh`, `bash`, and Perl. However, a shell script is usually stored as an ASCII text file. It usually receives its input from `stdin`, and sends its output to `stdout`. On the other hand, an Xcode menu script is stored as a UTF-8 text file. It often receives its input from the active source file. Where it sends its output will depend on how the script is configured.

Figure 2 shows the basic structure of a typical Xcode menu script. Like the shell script, it starts with a declarative header, also known as the she-bang. This header indicates the

command-line tool that will interpret and execute the script. It is also used to pass command-line options to the tool. Make sure to check that the tool is correctly installed on the MacOS X platform. Otherwise, Xcode will return an NSTask error message stating the absence of the tool. It will also terminate the execution of the rest of the script.

For example, if the declarative header reads as `#!/bin/bash`, the `bash` tool will execute the menu script. If it reads as `#!/usr/bin/python -t`, the `python` tool will execute the script. The tool will also display warning messages for any inconsistent tabs present in the script.

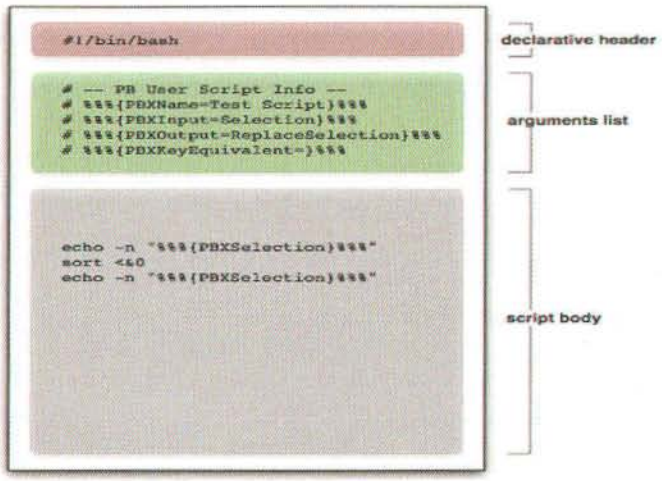


Figure 2. Structure of a basic menu script (sort.sh).

Right after the declarative header is the arguments list. This list defines the input source for the script as well as its output destination. Also, it is where the script is assigned with a menu name and a shortcut key.

Finally, the last part of the script is the script body. This body consists of one or more command statements that will perform the specified menu action. The commands used by these statements depend largely on the command-line tool chosen for the task. Consult your tool's user manual for more information about its commands.

Known shortcomings

A number of issues limit the capabilities of an Xcode menu script. The most notable one is that the Script menu is enabled only if a source file has been selected. Otherwise, it is disabled even in the presence of an active Xcode project. This behavior prevents a script from performing project-oriented tasks such as backups, and SCM check-ins and checkouts.

Also, a menu script can only interact with the Xcode user in a limited way. Often, it is in the form of dialogs generated using the `StandardsAdditions` scripting library. For a menu script to access and display any one of these dialogs, it has to use the `osascript` tool.

But a menu script cannot use the `osascript` tool as its command-line tool. If its declarative header is `#!/usr/bin/osascript`, the script will only generate errors when executed by Xcode. This prevents the script from being written in pure AppleScript.

The Xcode Menu Script Components

Xcode provides a number of built-in arguments that can appear in the arguments list. To prevent the command-line tool from interpreting them, these arguments are enclosed within a `%%%{...}%%%` delimiter. The most important argument is `PBXName`. Use this to assign a menu name to the script. That name is displayed on the Script menu each time it is rebuilt.

Also equally useful is the `PBXKeyEquivalent` argument. Use this argument to assign a keyboard shortcut to the script. The shortcut itself consists of a modifier key followed by a single alphanumeric character. Assume, for example, the following entries in the script's arguments list.

```
# %%%{PBXName=Test Script}%%%
# %%%{PBXKeyEquivalent=@B}%%%
```

This means the script will have a name of Test Script on the Script menu. It can also be invoked by pressing the `<CMD>` key together with the `<B>` key. To execute the script, either its name is selected from the Script menu, or its keyboard shortcut is typed on the keyboard.

Other supported modifier keys include `<Opt>` (represented by a tilde, '~'), `<Ctrl>` (represented by a caret, '^'), and `<Shift>` (represented by a dollar sign, '$'). Make sure to assign unique shortcut keys to each menu script. Otherwise, the wrong script or operation may be invoked if that shortcut is used elsewhere.

Handling input data

To supply data to the menu script, Xcode provides the built-in argument, `PBXInput`. This argument is the functional equivalent of the `stdin` file descriptor.

The source of data for the `PBXInput` argument comes from the active source file. This will be the file being edited in the Xcode's text editor pane. For instance, if the `test.c` file is being edited, data for the `PBXInput` argument will come from that file.

The `PBXInput` argument takes one of three possible values. The `Selection` value tells Xcode to use the currently selected text as the input data for the menu script. Conversely, the `AllText` value tells it to use the entire source text as the input data. Finally, the `None` value tells Xcode to provide no data to the script. The same also happens if the `PBXInput` argument is omitted from the menu script.

Another way of providing input data to the menu script is through the built-in argument, `PBXArgument`. This is used to pass parameters to the menu script. It performs the same function as a command-line option.

A `PBXArgument` can only have a single parameter. But a menu script can have more than one `PBXArguments`. To access the first nine `PBXArguments`, use the positional variables `$1` to `$9`, with `$1` corresponding to the very first one. If there are more

than nine PBXArguments, make sure to enclose the positional number within a pair of braces. For instance, to retrieve the value of the 25th PBXArgument, use the variable ${25}.

Assume, for example, the following entries in the script's arguments list.

```
# %%%{PBXArgument=-r}%%%
# %%%{PBXArgument=-z}%%%
# %%%{PBXArgument=-e}%%%
```

The positional variables $1, $2, and $3 will then return their respective values of -r, -z, and -e.

Handling output results

Xcode also provides the built-in argument, PBXOutput, to handle the output results of a menu script. This argument is the functional equivalent of the stdout file descriptor. If the menu script does not have the PBXOutput argument, any output results it generates will be simply discarded.

The PBXOutput argument can have one of seven possible values. Each value determines how the output results are to be handled by Xcode. For instance, the Discard value tells Xcode to ignore any results generated by the menu script. This has the same effect as not adding a PBXOutput argument to the script.

The next three values tell Xcode how to display the output results onto the active source file. The ReplaceSelection value replaces the currently selected text with the output results. On the other hand, the InsertAfterSelection value appends the results to the selected text. Finally, the ReplaceAllText value replaces the entire source text with the results. Note that the resulting change in the source text is not permanent. Choosing Undo from the Edit menu can still restore the original text.

The SeparateWindow value, on the other hand, tells Xcode to display the output results in a separate window. At the time of this writing, however, Xcode does not display the results in a separate document window. Instead, it uses a modal dialog to display those results. Hopefully, future versions of Xcode will address this issue by providing both display options. In the meantime, see the script example shown in Listing 2 for a good workaround.

The next useful PBXOutput value is the Pasteboard value. It tells Xcode to store the output results onto the clipboard buffer. Choosing Paste from the Edit menu then places the results onto any editable text window. The results remain in the clipboard buffer until the next Cut or Copy operation replaces them. They can also be replaced by another menu script if its PBXOutput is also set to Pasteboard.

The last PBXOutput value is the AppendToAllText value. This value tells Xcode to place the output results at the very end of the active source file. However, this feature is broken in version 2.3 of Xcode. Any output results from a menu script are not displayed anywhere on the source file. The README files for both Xcode 2.4 and 2.4.1 also showed no signs of whether or not this bug is fixed.

The macro variables

Xcode provides a number of built-in macro variables that can be used in a menu script. It then replaces these variables with their actual values prior to script execution. Use these macros to simplify various aspects of a menu script. Make sure to enclose each macro variable within the %%%{...}%%% delimiters. This will prevent the command-line tool from accidentally interpreting them.

The first macro variable is the PBXTextLength macro. It returns the total number of characters contained in the active source file. The character count also includes control characters such as newlines (0x0d) and tabs (0x09). In short, this macro variable represents the size of the source file in bytes.

Three macro variables are used for processing a text selection. The PBXSelectionStart macro returns the number of characters before the start of the selection. Conversely, the PBXSelectionEnd return the number of characters from the start of the file up to the end of the selection. Finally, the PBXSelectionLength returns the number of characters contained by the selection. Its returned value is equal to the difference between PBXSelectionEnd and PBXSelectionStart.

Figure 3 shows how these three macros are interrelated with each other. This example assumes that the active source file contains only the five-word phrase shown. Note that, in this example, the selected text is highlighted in grey.

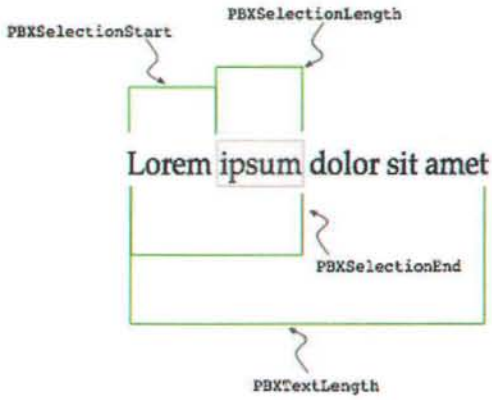


Figure 3. Macro variables on a text selection.

On a related note, the built-in macro PBXSelection sets the start and end of a selection. It is used to select a portion of the output result. For example, assume that a menu script generates the following output.

```
echo "Lorem ipsum "
echo "%%%{PBXSelection}%%%dolor "
echo "%%%{PBXSelection} sit amet"
```

If the PBXOutput argument is set to use the active source file, the word dolor will be selected on that file. However, make sure to use the PBXSelection macro in pairs. If Xcode does not find a matching PBXSelection macro for a previous one, it will not perform the text selection.

There are also two built-macros that return a file path. The first one, PBXFilePath, returns the absolute file path of the active source file. The path is returned as a string value, and is rendered as a Unix file path. Use this macro

*HASP, the #1 Choice of Software Developers Worldwide**

**Source: IDC Bulletin #34452*

Finally, put a

STOP

to unauthorized software use.

HASP® HL

REINVENTING SOFTWARE PROTECTION & LICENSING

Follow the signs to HASP HL –
the market's leading software DRM solution

HASP HL provides the highest level of security for your software. Featuring easy-to-use tools, HASP HL automatically protects your software and enables new and innovative licensing options.

- ***Strong copy protection:*** *Powerful 128-bit AES encryption provides a strong locking mechanism that ensures you get paid for every copy of your software in use.*
- ***Unmatched intellectual property protection:*** *Automatically protects Windows executables, DLLs, Mac applications, and offers class-level obfuscation for .NET framework 2.0 applications. Multiple encryption layers ensure your valuable IP remains unreachable and your R&D investment is protected.*
- ***Secure & flexible licensing:*** *HASP HL enables a variety of secure and flexible licensing models and ensures end-users comply with software licensing terms.*

See for yourself why IDC ranks HASP #1.
Request a Software Developer Kit today at www.Aladdin.com/StopPiracy_MT.

• NORTH AMERICA: 1-800-562-2543, 1-847-818-3800
• UK • GERMANY • ISRAEL • BENELUX • FRANCE • SPAIN • ASIA PACIFIC • JAPAN

Aladdin®
SECURING THE GLOBAL VILLAGE

© Aladdin Knowledge Systems, Ltd. All rights reserved. Aladdin and HASP are registered trademarks.

www.Aladdin.com/HASP

to manipulate the file, its contents, or its directory at the shell level.

The second macro is PBXUtilityScriptsPath. This macro returns the directory path for all the utility scripts bundled with Xcode. By default, it returns the path as

```
/System/Library/PrivateFrameworks/DevToolsInterface.framework ¬
  /Resources/UtilityScripts.
```

Use this macro to refer to any one of the utility scripts, which will be discussed next.

The utility scripts

In addition to built-in arguments and macros, Xcode also comes with a number of utility scripts. These scripts are primarily used to add modal dialogs to a menu script. Xcode users can then interact with the menu script through these dialogs.

The utility scripts use the osascript command-line tool to generate their modal dialogs. This tool sends AppleScript calls to the StandardAdditions library, which then displays the desired dialog. When a user interacts with the dialog, the tool returns the results to stdout as a string. If the user cancels the dialog, the tool sends an empty string to stdout and a cancellation message (error -128) to stderr.

At the time of this writing, Xcode comes bundled with five utility scripts. The first script, AskUserForApplicationDialog, displays a list of all applications present on the MacOS X volume. It requires two string parameters: the dialog title and the prompt message. For example,

```
REPLY=`%%%{PBXUtilityScriptsPath}%%%/AskUserForApplicationDialog ¬
        "Application List" "Pick an application"`
```

displays a dialog with the title Application List and the message Pick an application. When a user selects an application, the script returns the absolute file path to that application as a string. In the above example, the returned string is stored in the shell variable REPLY.

The second utility script is the AskUserForStringDialog script. This script prompts the user for an input string. It takes a single string parameter, which is the default input value. For example, the following statement

```
REPLY=`%%%{PBXUtilityScriptsPath}%%%/AskUserForStringDialog ¬
        "untitled"`
```

should display an input dialog with the string untitled as the default value. After the user types in a string and presses the Enter button, the script returns the string value to the menu script. However, this utility script has one notable flaw. Its prompt message is set to the default string value of Enter your name, and it cannot be changed. For a good workaround, see the script example shown in Listing 4.

The rest of the utility scripts are used for I/O interaction. The AskUserForExistingFileDialog script prompts the user to select a file from the MacOS X volume. It takes a single string parameter, which is the prompt message. For example, the statement

```
REPLY=`%%%{PBXUtilityScriptsPath}%%%/AskUserForExistingFileDialog ¬
        "Choose a file to be edited"`
```

displays the dialog with the prompt Choose a file to be edited. When the user selects a file, the script returns the absolute file path to that file as a string.

The dialog displayed by this script uses ~/Documents as its default directory. It shows any files and directories that are hidden or invisible. Also, it resolves links to other directories. But it will not do the same for links to other files, treating them instead as actual files.

The next I/O utility script is the AskUserForFolderDialog script. This script prompts the user to select a directory from the MacOS X volume. It also takes a single string parameter for its prompt message. For example, the statement

```
REPLY=`%%%{PBXUtilityScriptsPath}%%%/AskUserForFolderDialog ¬
        "Select a destination"`
```

displays the dialog with the prompt Select a destination. When the user selects a directory, the script returns the absolute file path to that directory as a string.

The dialog displayed by the script allows users to create a new directory, and to select it as well. It also resolves links to other directories. But, it will not display any directories that are hidden or invisible.

The third I/O utility script is the AskUserForNewFileDialog script. This script prompts the user to select the directory where a new file can be stored. It also prompts for a name to be assigned to that file. The script takes two string parameters: one for the prompt message, the other for the default filename. For example, the statement

```
REPLY=`%%%{PBXUtilityScriptsPath}%%%/AskUserForNewFileDialog ¬
        "Save the backup as" "backup.file"`
```

displays the dialog with the prompt Save the backup as, and a default filename of backup.file. If a file exists with the same name, the dialog will display a warning alert. Also, once the user has selected a directory and a filename, the script returns the absolute file path to that new file. It will not, however, create the file.

Creating an Xcode Menu Script

The Xcode project template

Often, writing an Xcode menu script means using a third-party text editor. But why not use Xcode itself to write and install a menu script? The Xcode project template, Xcode Menu Script Action, is created primarily for this purpose. This template, as well as other support files, are available as part of the XcodeMenu installer package.

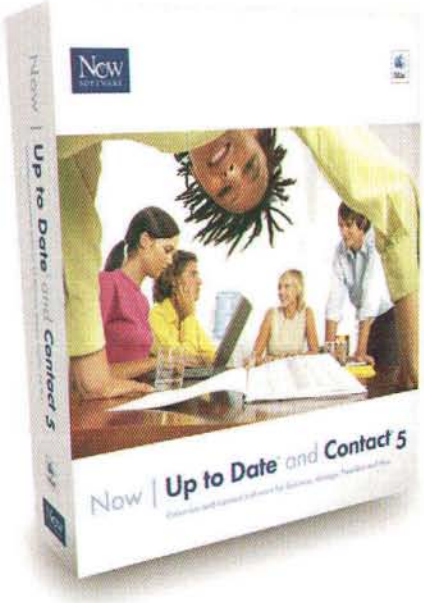
The template itself contains a starter script named myscript.sh. This script has the basic arguments list shown in Figure 2. Modify this list to the appropriate settings for this script.

The script also has a custom list containing two arguments. These arguments determine how the script is to be installed. The first one, USRDir, specifies the subdirectory that will contain the menu script. This subdirectory is then created inside the Xcode script directory.

Now **scheduling** and **contact management** for your entire organization.

Now | **Up to Date**® and **Contact**® **5**

Calendar and Contact Software for Business, Groups, Families and You.



Is this project on schedule? When are you available to meet about the systems upgrade? Where are all the field techs today? When was the last time anyone talked to our biggest customer?

Virtually all groups live (or die) by their abilities to meet deadlines and keep track of their customers, prospects, and vendors. Few small companies or even departments of big companies have the tools they need.

Now Up-to-Date & Contact might just be the calendar and contact software for you. It's time-tested and used by more Mac-based companies than any other solution. And it's cross-platform–available for your PC users, too. It's easy to install and manage and simple for your employees to understand and use.

Using Now Up-to-Date & Contact you can schedule meetings for multiple users, view multiple, simultaneous calendars, and reserve rooms and resources. You can share contact information about your customers, prospects and vendors. And using our free server software you can set it up in minutes and share with users in the office or from anywhere with an internet connection.

Call us now at 866-527-0556 or email us at mactech@nowsoftware.com and we'll send you our free evaluation kit, including the book that will make it all easy, "Take Control of Now Up-to-Date & Contact" from Take Control books!

NOW SOFTWARE

Phone: 866-527-0556

Web: www.nowsoftware.com

Copyright © 2006 by Now Software, Inc. All rights reserved. Now Up-to-Date and Now Contact are registered trademarks of Now Software, Inc. Mac and the Mac logo are trademarks of Apple Computer, Inc., registered in the U.S. and other countries. All other trademarks acknowledged.

The second argument is USRName. This specifies a unique filename for the menu script. It also specifies the two-digit number that determines the script's position on the Script menu. Always make sure to assign a two-digit number to the menu script. Also, make sure to add a dash between the number and the script's filename. Failure to do either one renders the script inaccessible from the Script menu.

For example, assume that a menu script has the following entries in its custom header.

```
# - Custom User Script Info -
# %%%{USRDir=75-CVS Control}%%%
# %%%{USRName=05-cvsbackup.sh}%%%
```

Xcode first checks to see if the subdirectory 75-CVS Control exists in the script directory. If it does not, Xcode creates a new subdirectory with that name. Next, Xcode copies myscript.sh into that subdirectory. It then renames the copy as 05-cvsbackup.sh.

The Xcode project can also have multiple scripts. Each script can have its USRName set to its source filename, as long as the required two-digit number and dash precedes that name. Each script can share the same USRDir subdirectory as the other scripts. Alternatively, it can have its own USRDir subdirectory.

Using the project template

To create a new Xcode menu script project, choose New Project from the File menu. Then, from the Project Assistant dialog, select Xcode Menu Script Action (Figure 4) and press the Next button. Assign a new name to the project, and select the directory to store it. Click on the Finalize button to create and save the new project.

To install and test the default source script, choose Build from the Build menu. If the build process generates no errors, choose Reset Menu from the Script menu. This will cause the menu to update its list of menu items. After a second or two has elapsed, click on the Script menu. There should be submenu

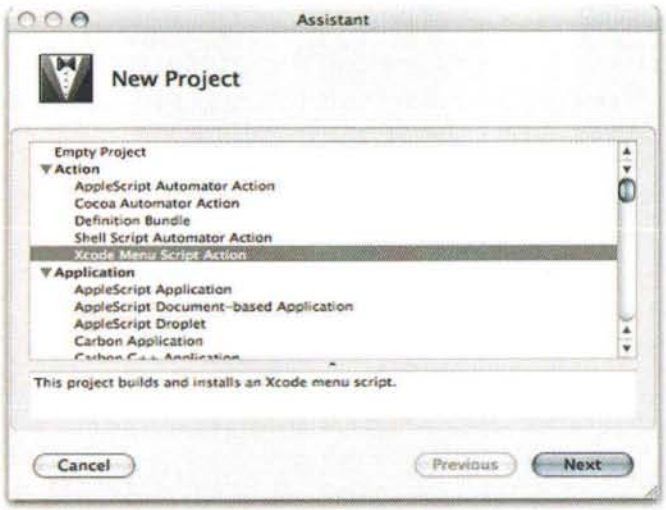


Figure 4. Selecting the project template.

entry named Test Scripts, and that submenu should have a single menu item named My Test Script (Figure 5).

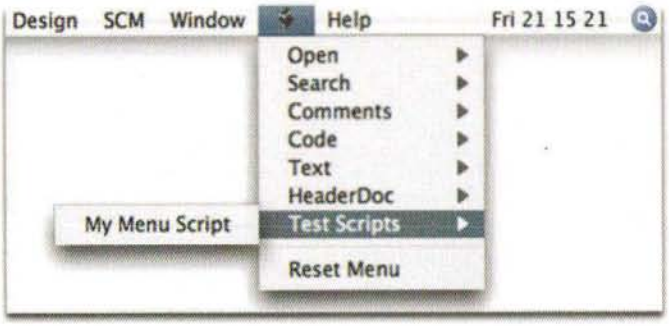


Figure 5. A single menu script.

To add another source script to the Xcode project, choose New File from the File menu. Then, from the New File Assistant, choose Menu Script File and click on the Next Button (Figure 6). Assign a new name to the file, and the project and target to which it should belong. Click on the Finalize button to save the file, and have it added to the project.

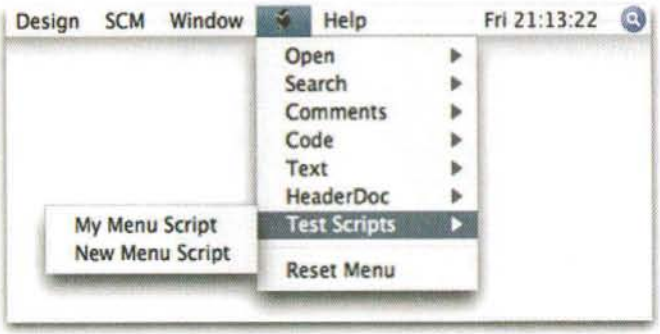


Figure 6. Selecting the file template.

Choose Build from the Build menu to add the new menu scripts to the Script menu. Then choose Reset Menu from the Script menu to update its list. The submenu should now have two menu scripts as shown in Figure 7.

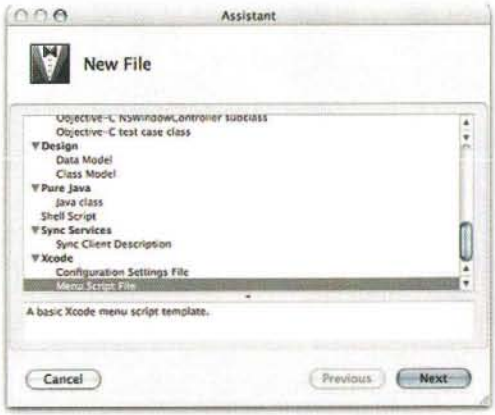


Figure 7. Two menu scripts.

Xcode Menu Script Examples

Counting the number of lines

Listing 1 shows one of the simplest menu scripts possible for the Xcode environment. This script uses the `wc` tool to count the number of lines in the source file. It then displays the resulting count using a modal dialog.

Listing 1. Count the number of source lines (lineCount.sh).

```
# - PB User Script Info -
# %%%{PBXName=Count the number of source lines}%%%
# %%%{PBXInput=None}%%%
# %%%{PBXOutput=SeparateWindow}%%%
# %%%{PBXKeyEquivalent=}%%%
# %%%{PBXArgument=}%%%
# %%%{PBXIncrementalDisplay=YES}%%%
#
# - Custom User Script Info -
# %%%{USRDir=90-Sample Menu Scripts}%%%
# %%%{USRName=01-linecount.sh}%%%
#
# count the number of lines in the source file
CNT_SRC="%%%{PBXFilePath}%%%"
CNT_LINES=`wc -l $CNT_SRC`

# parse out the count value
CNT_LINES=`echo $CNT_LINES | awk '{ print $1 }'`

# display the count results
CNT_MESSAGE="Number of lines: $CNT_LINES"
echo "$CNT_MESSAGE"
```

Search for a selected word or phrase

The script shown in Listing 2 is a little more sophisticated. It first stores the selected text into the `SRCH_DAT` variable using the `cat` tool. Notice the dash right after the tool. This tells `cat` to receive its input data from `stdin`.

The script first retrieves the file path to the active source file. It then determines the file path to the `search.output` file, and stores it into the `SRCH_OUT` variable. Next, the script passes the active source file to the `nl` tool to renumber the source lines. Afterward, it uses `grep` to parse out those lines that contain the `SRCH_DAT` pattern, and stores the results into the `search.output` file.

This script also demonstrates how to use Xcode to display the search results. It first converts the file path stored in `SRCH_OUT` to a form usable by AppleScript. It then sends a number of AppleScript calls to the `osascript` tool. The tool then uses these calls to coerce Xcode into opening the `search.output` file.

Listing 2. Searching for a selected text (selectSearch.sh).

```
# — PB User Script Info —
# %%%{PBXName=Search selected text}%%%
# %%%{PBXInput=Selection}%%%
# %%%{PBXOutput=Discard}%%%
# %%%{PBXKeyEquivalent=}%%%
# %%%{PBXArgument=}%%%
# %%%{PBXIncrementalDisplay=YES}%%%
#
# — Custom User Script Info —
# %%%{USRDir=90-Sample Menu Scripts}%%%
# %%%{USRName=02-selectSearch.sh}%%%
#
# retrieve the search parametre
SRCH_DAT=`cat -`

# renumber the search document
SRCH_INP="%%%{PBXFilePath}%%%"

#prepare the output file
SRCH_DIR=`pwd`
SRCH_OUT="$SRCH_DIR/search.output"
if [ -f $SRCH_OUT ];
then
  rm -f $SRCH_OUT
fi

#perform the search and save the output to the file
nl -b a $SRCH_INP | grep "$SRCH_DAT" 1> $SRCH_OUT

#display the results of the search
SRCH_OUT="OS X"`echo $SRCH_OUT`
SRCH_OUT=`echo ${SRCH_OUT//\//:}`
SRCH_OUT="\"$SRCH_OUT\""

osascript <<-APPLESCRIPT
  tell application "Finder"
     set fileref to get file $SRCH_OUT as string

     tell application "XCode"
      activate
      open file fileref
     end tell
   end tell
  APPLESCRIPT
```

Backing up an Xcode project

Listing 3 shows how a menu script can create a backup of the current Xcode project. It also demonstrates how the script uses a utility script to interact with the Xcode user.

First, the script navigates from the current working directory until it reaches the level where it finds the first `.xcodeproj` bundle. This is done in case the active source file happens to be stored inside a subdirectory within the project directory. Next, the script uses the `AskUserForNewFileDialog` utility script to prompt the user for a backup name and destination. It then stores the result into the `PRJ_BCK` variable.

Now the script uses the `expr` tool to check the contents of the `PRJ_BCK` variable. If the user cancels the dialog prompt, the variable will contain a null string, and the rest of the script is not executed. Otherwise, that variable will likely have a valid file path. The script then uses the `tar` tool to archive and compress the Xcode, and stores the backup archive onto the specified destination.

Listing 3. Backing up the active project (projBackup.sh).

```
# — PB User Script Info —
# %%%{PBXName=Backup the Xcode project}%%%
# %%%{PBXInput=None}%%%
# %%%{PBXOutput=SeparateWindow}%%%
# %%%{PBXKeyEquivalent=}%%%
# %%%{PBXArgument=}%%%
# %%%{PBXIncrementalDisplay=YES}%%%
#
# — Custom user script info
# %%%{USRDir=90-Sample Menu Scripts}%%%
# %%%{USRName=03-projBackup.sh}%%%
#
# initialise the following shell variable
PRJ_MSG="Save the backup as"

# navigate to the project directory
PRJ_CHK=`ls -d *.xcodeproj | wc -l`
while [ $PRJ_CHK -lt 1 ];
do
  cd ..
```

```
  PRJ_CHK=`ls -d *.xcodeproj | wc -l`
done

# retrieve the current directory
PRJ_DIR=`pwd`

# generate a date/time tag
PRJ_TAG=`date "+%H%M%S"`
PRJ_NOM="Backup_$PRJ_TAG"

# select a backup filename
PRJ_BCK=`%%%{PBXUtilityScriptsPath}%%%/AskUserForNewFileDialog \
          "$PRJ_MSG" "$PRJ_NOM"`

# was it successful?
PRJ_CHK=`expr "$PRJ_BCK" : '.*'`

if [ $PRJ_CHK -gt 0 ];
then
  PRJ_BCK="$PRJ_BCK.tar.gz"

  # start the backup
  tar -czf $PRJ_BCK *.*

  # the backup is done
  echo "Backup created at: $PRJ_BCK"
fi
```

Exporting a CVS project archive

The script shown in Listing 4 demonstrates how to use CVS to export the latest copy of the Xcode project from the project archive. It also shows how to use the `osascript` tool to provide a workaround for the `AskUserForStringDialog` utility script.

First, the script checks to see if the project is currently being managed by CVS. It does this by looking for a CVS subdirectory within the project itself. If the subdirectory does not exist, the script displays the appropriate dialog message.

If the project is being managed by CVS, the script retrieves the path to the project archive from the `Root` file. It then uses the `osascript` tool to invoke the `display dialog` function with AppleScript. This dialog prompts the user for an export tag, offering a timestamp as the default tag. The results of the dialog are then stored into the `CVS_TAG` variable.

Next, the script uses the `cvs tag` command to apply the tag to the Xcode project. It then retrieves the project's archive name from the `Repository` file. Afterward, the script prompts the user for an export name and destination using the `AskUserForNewFileDialog` utility script. It stores the result of that interaction into the `CVS_XPT` variable.

Finally, the script uses the `cvs export` command to export a copy of the Xcode project from the archive and onto the desired destination. If it is successful, the script displays a dialog showing the directory path of the exported project.

Listing 4. Exporting from CVS (cvsExport.sh).

```
# — PB User Script Info —
# %%%{PBXName=Export CVS Xcode project}%%%
# %%%{PBXInput=None}%%%
# %%%{PBXOutput=SeparateWindow}%%%
# %%%{PBXKeyEquivalent=}%%%
# %%%{PBXArgument=}%%%
# %%%{PBXIncrementalDisplay=YES}%%%
#
# — Custom User Script Info —
# %%%{USRDir=90-Sample Menu Scripts}%%%
# %%%{USRName=04-cvsExport.sh}%%%
#
# check for the following subdirectory
CVS_DIR=`pwd`
CVS_DIR="$CVS_DIR/CVS"

if [ -d $CVS_DIR ];
then
  # retrieve the CVS repository path
  CVS_ROOT=`cat $CVS_DIR/Root`

  # prompt the user for an export tag
  CVS_TAG=`date "+%H%M%S"`
  CVS_TAG=`osascript <<-APPLESCRIPT
    tell application "Xcode"
      activate
      display dialog "Enter a CVS export tag:" ¬
        default answer ${CVS_TAG}
      return (text returned of result) as string
    end tell
    APPLESCRIPT
  `

  # was it successful?
  CVS_CHK=`expr "$CVS_TAG" : '.*'`
  if [ $CVS_CHK -gt 0 ];
  then
    # apply the tag to the sources
    CVS_TAG="v$CVS_TAG"
    cvs -Q tag $CVS_TAG

    # prompt the user for an export directory
    CVS_MSG="Export the project to:"
    CVS_NOM=`cat $CVS_DIR/Repository`
    CVS_XPT="$CVS_NOM$CVS_TAG"

CVS_XPT=`%%%{PBXUtilityScriptsPath}%%%/AskUserForNewFileDialog
"$CVS_MSG" "$CVS_XPT"`

    # was it successful?
    CVS_CHK=`expr "$CVS_XPT" : '.*'`
    if [ $CVS_CHK -gt 0 ];
    then
      # export the CVS project
      cvs -d $CVS_ROOT -Q export -R -r $CVS_TAG \
          -d $CVS_XPT $CVS_NOM

      echo "Project has been exported to: $CVS_XPT"
    fi
  fi
else
  echo "This project is currently not under SCM by CVS."
fi
```

Concluding Remarks

Menu scripts are a flexible and effective way to customize and enhance the Xcode environment. Their support for standard shell scripting languages makes them easy to learn and implement. They can add features that are essential to the workflow, but are not available in Xcode. They can automate certain tasks that are otherwise repetitive and prone to mistakes. They can also invoke external tasks without the need to exit the Xcode environment.

Without a doubt, menu scripts are one of the reasons why Xcode continues to be the preferred development tool for MacOS X.

Bibliography and References

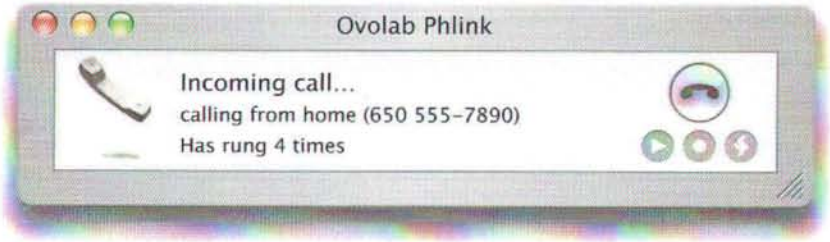
Apple Computers. "Using Scripts to Customize Xcode". Xcode 2.3 User Guide. Copyright 2004, 2006. Apple Computers, Inc.

Cooper, Mendel. Advanced Bash-Scripting Guide. Revision 4.1. 2006 Oct 08. Online: `tldp.org/LDP/abs/abs-guide.pdf`.

About The Author

JC is a freelance engineering consultant and writer currently residing in North Vancouver, British Columbia. He writes for various publications and teaches origami at his local district's public library. He can be reached at anarakisware@cashette.com.

When a stranger calls.



Let Phlink take the call. Personalized greetings, voicemail, notifications, and much more.

Ovolab Phlink is the ultimate message center for your Mac. It **answers** phone calls and identifies callers using Caller ID and Apple's Address Book. It greets your friends with personalized messages. It **records** and stores messages on your computer – and even forwards voicemail to **email** as AAC audio attachments.
Featuring multiple **voice mailboxes**, high-quality audio, Spotlight searching and fax capabilities, Ovolab Phlink makes your telephone part of the digital hub!
And you can fully customize Ovolab Phlink to do exactly what you need, using AppleScript: even set it up to call you back on your cell phone when important clients leave a message.
Check it out now at **www.ovolab.com**.

OVOLAB
software for the creative mind

Mac Universal

Macworld MacMinute TidBITS macHOME versiontracker

Copyright © 2006 by Ovolab. Ovolab is a registered trademark of Ovolab sas. All other trademarks and trade names are the property of their respective owners.

The R statistics package

What is R and how you can use it.

By Mihalis Tsoukalos

Introduction

The R language of statistical computing is a free implementation of the S language, also used for statistical computing. Rick Becker, John Chambers and Allan Wilks developed S at the famous AT&T Bell Labs. The commercial version of S is called S-PLUS and the problem with S-PLUS is that it is very expensive.

Version 1.00 of R was first released on February 2000 and the latest version of R, at the time of writing this article, is 2.4.0. Version 2.3.1 is used for the purposes of this article.

R and S-PLUS can be used for statistical analysis and graphics. Put simply, you insert datasets that you want to analyze and visualize in creative ways.

What, a statistics package in MacTech?

Well, you may wonder what is a statistics package doing in MacTech so I think that I have to explain some things to you. First, let me tell you that statistics are not that difficult in all of their aspects —you can use a small division of statistics that are incredibly simple. Second, I should add that statistics can be very useful for systems administration purposes including Mac OS X. Last, you should know that statistics are particularly useful when you want to generate a report for your boss that usually does not understand technical information very well.

If you still feel uncomfortable with statistics, please have in mind that this article is not going to use higher-level statistics. What will be used are straightforward statistical methods and some R commands that generate a lot of handy and impressive graphical images.

Introducing R

The good news is that there is a Macintosh version of R that can either run as a console or a graphical application. R can also run on Windows as well as other UNIX machines.

Figure 1 shows the console version of R whereas figure 2 shows the graphical version of R. In order to run the console version you just have to type R provided that the directory of the R command is included in your PATH variable.

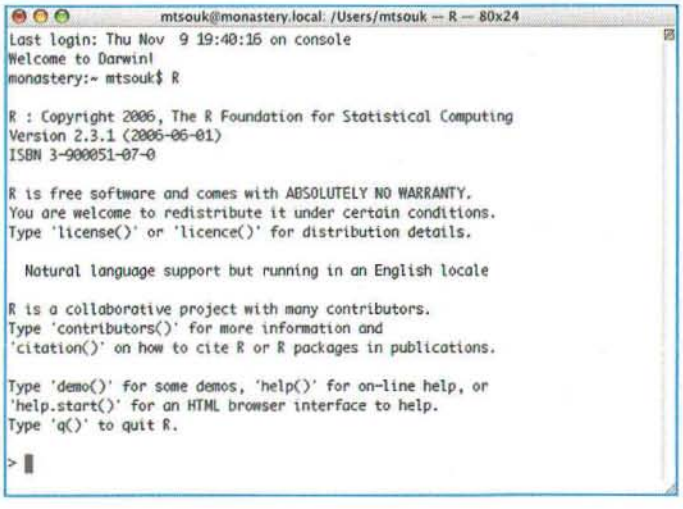


Figure 1: Running R from the console

As you can see both versions of R have a similar text window that you enter your commands. Nevertheless, the GUI version is more elegant and offers more options. By typing q()

NetTeam SERVER

Susbsription service now available, running on Mac OS X Server.
Details at: **www.netteamserver.com/subscribe**

Connect your people, contacts, relationships, projects, tasks, documents, blogs, web content ... your knowledge itself ... and magic follows.

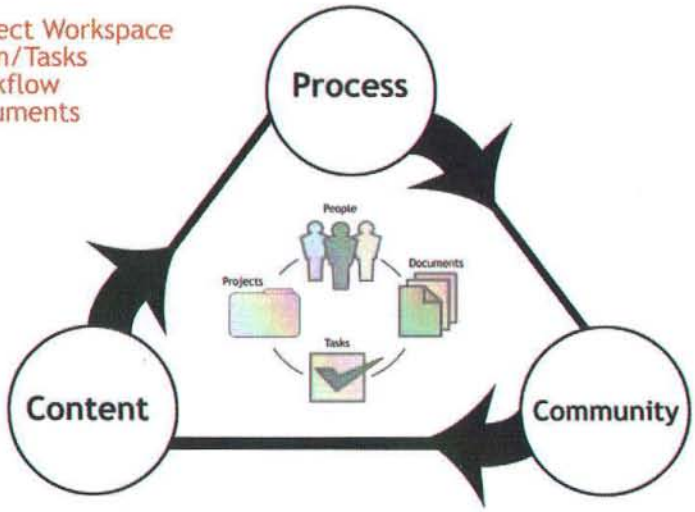
Most businesses already have this data but in different systems, used by different people, in different departments. What a nuisance! NetTeam Server brings it all together, in a web app that everyone can use, anywhere. What a difference!

NetTeam Server

NetTeam Server is a business process, content management, collaboration and social networking web app for businesses and organizations of any size. It offers people, project, task and document management services and has a powerful API to support customization.

The triangle represents NetTeam Server's unique combination of functionality for three critical areas: **Process**, **Content** and **Community**. We're a good choice even if you only need one of these, but if your business operations embrace two or three, you'll love what we can do for you.

- Project Workspace
- Team/Tasks
- Workflow
- Documents



- Web Content/Site Management
- Web Document Library
- Project and Shared Blogs
- News Editor

- Users, roles and relationships
- Simple CRM
- Social Networking
- Profile & Personal Blogs

Features

NetTeam Server's fundamental constructs are **People**, **Projects**, **Tasks** and **Documents**.

These four are central to all business activities, so we bring them together in a coherent workspace that makes NetTeam Server a true *Business Operating System*. The portal interface can be tailored to match client branding and linked systems, and includes five Editors (see screenshot) and a modern, AJAX-enhanced, configurable user interface.

User roles determine access privileges and which (if any) tools are presented on login. Blogs are used extensively to support publishing, information and knowledge management. Wikis will be available in a late-summer update.

NetTeam Server is available for Mac OS X Server, Linux and Windows platforms and supports all leading web browsers. A Web Services API allows tight integration with other systems and single sign-on. We also offer a Java mobile client which can be tailored to support mobile workforce applications.

NetTeam Server has been successful in deployments serving from 10 to 10,000 users and may be installed on a server of your choosing, used on a dedicated server we provide, or rented as a subscription service (multi-company server).

Consultant, reseller and developer enquiries welcome.

NetTeam • www.netteamserver.com
2300 M St NW, Suite 800, Washington DC 20037, USA
+ 1 (202) 250 3434 • info@netteamconsulting.com

—this works for both versions— you can quit R. Additionally, you can quit the GUI version from its usual Mac-related menus.

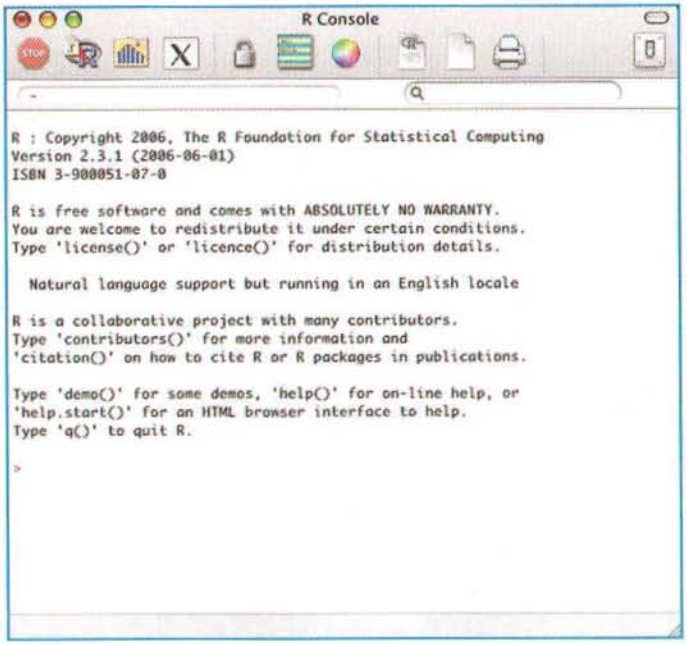


Figure 2: The R GUI

R can also be used as a simple calculator. The following examples illustrate it:

```
> 1 + 5
[1] 6
> abs(-1.4)
[1] 1.4
```

R can also be used in a batch mode —only the command line version of it— where you store the desired commands in a file and execute them from the command line or a *cron* job. The following commands demonstrate it:

```
$ cat example.R
1 + 1;
5 - 8;
$ R CMD BATCH example.R
$ cat example.Rout

R : Copyright 2006, The R Foundation for Statistical
Computing
Version 2.3.1 (2006-06-01)
ISBN 3-900051-07-0

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Previously saved workspace restored]

> invisible(options(echo = TRUE))
> 1 + 1;
[1] 2
> 5 - 8;
[1] -3
>
> proc.time()
[1] 0.634 0.169 0.818 0.000 0.000
>
$
```

As you can see, the output for the example.R batch file is stored in a file called example.Rout. If the batch executed commands generate any graphics files, those graphics files should have been created as well.

Learning more about R and Statistics

One of the most important things that you have to learn is how to insert external data inside R. This can be made using the ***read.table()*** command. The following example shows how to use it:

```
$ cat TEST.data
Name      Salary  Age
Mike      100000  25
Eugenia   200000  22
John      125000  26
PIK       250000  38
Antonis   180000  30
$ R
...
> SAL <- read.table("TEST.data", header=TRUE)
> SAL
      Name  Salary Age
1     Mike  100000  25
2 Eugenia  200000  22
3     John  125000  26
4      PIK  250000  38
5 Antonis  180000  30
>
```

In this example, a table was saved in a text file called TEST.data and loaded into R. Notice the ***header=TRUE*** parameter that tells that the first line of the TEST.data file is the header row of the table and therefore should be treated in a different way. Also notice that the SAL variable holds the whole table.

Imagine that you want to learn some information about your SAL data. The ***summary()*** command can be used as follows:

```
> summary(SAL)
      Name        Salary            Age
 Antonis:1   Min.   :100000   Min.   :22.0
 Eugenia:1   1st Qu.:125000   1st Qu.:25.0
 John   :1   Median :180000   Median :26.0
 Mike   :1   Mean   :171000   Mean   :28.2
 PIK    :1   3rd Qu.:200000   3rd Qu.:30.0
             Max.   :250000   Max.   :38.0
>
```

As you will understand, this is a great way to summarize your data. Now, let us explain the output.

The Name column does not contain numbers so R sums the occurrences (considering each value as a string) of each "string" and prints the top numbers. As far as Salary and Age columns are concerned, which are both numeric, R calculates and displays the following six values:

Your G5's Dream Date

SERIAL ATA 3Gb/s

The 3ware Sidecar & Your Apple Power Mac G5: The Perfect Match

The 3ware® Sidecar by AMCC is a powerful SATA RAID desktop storage solution designed specifically for the Apple® Power Mac® G5. At speeds 4-8x faster* than Firewire or USB, it can store and protect tons of your photos, songs, videos, illustrations and web pages.

Whether you're editing and archiving digital photo shoots or snapshots, home movies or future Academy Award® winning films, garage jam sessions or professional mixes — rest assured your data will always be protected. The 3ware Sidecar is designed for creative professionals and enthusiasts who care about their data and just can't risk losing it! With the 3ware Sidecar, your data is RAID protected, so a failed drive won't mean the loss of hours of creative output.

On the set, in your studio or at the office, the 3ware Sidecar lets you think outside the box. And with up to 3TB** of storage capacity, there's no need to worry about running out of space. Just install, set up and connect — it's as easy to use as 1-2-3.

3ware Sidecar, the perfect partner for your G5 workstation — no dinner required.

AMCC STORAGE

Think Outside the Box
Find out more at **www.3ware.com**
Or call (877) 88-3ware; 877-883-9273

* SATA II: 300 MB/second; Firewire: 80 MB/s or 40 MB/s; USB 2.0: 48 MB/s
** Using four 750 MB SATA drives (not included)

BELL MICROPRODUCTS 1-888-394-2355

D&H 1-800-340-1001

SYNNEX CORPORATION 1-800-756-9888

AMCC and 3ware are registered trademarks of Applied Micro Circuits Corporation. All other trademarks are the property of their respective holders. Copyright © 2006 Applied Micro Circuits Corporation. All Rights Reserved.

- Min.: This is the minimum value of the whole data set.

- Median: It is an element that divides the data set into two subsets (left and right subsets) with the same number of elements. If the data set has an odd number of elements, then the Median is part of the data set. If the data set has an even number of elements, then the Median is the mean value of the two center elements of the data set.

- 1st Qu.: The 1st Quartile (q1) is a value, that does not necessarily belong to the data set, with the property that at most 25% of the data set values are smaller than q1 and at most 75% of the data set values are bigger than q1. Simplistically, you can consider it as the Median value of the left half subset of the sorted data set.

In the case that the number of elements of the data set is such that q1 does not belong to the data set, it is produced by interpolating the two values at the left (v) and the right (w) of its position to the sorted data set as:

```
q1 =  0.75 * v + 0.25 * w
```

- Mean: This is the mean value of the data set (the sum of all values divided by the number of the items in the data set).

- 3rd Qu.: The 3rd Quartile (q3) is a value, not necessarily belonging to the data set, with the property that at most 75% of the data set values are smaller than q3 and at most 25% of the data set values are bigger than q3. Put simply, you can consider the 3rd Quartile as the Median of the right half subset of the sorted data set.

In the case that the number of elements of the data set is such that q3 does not belong to the data set, it is produced by interpolation of the two values at the left (v) and the right (w) of its position to the sorted data set as:

```
q3 =  0.25 * v + 0.75 * w
```

- Max.: This is the maximum value found in the data set.

Please note that there exist many practices for finding Quartiles. In you try another statistical package, you may get slightly different results.

Creating Graphics with R

In the main part of the article I am going to tell you how to generate creative graphics with R. R has amazing graphical capabilities. Please look at the Bibliography and References section for more information. Also, the presented examples are real examples, using real data.

WWW server example

For this example, I used some old web server log data from a real web server. The duration of the logs is one week. Let me explain all the required steps.

First, let me show you some things about the log files using the wc command:

```
$ wc *.log
416041   6656584    119534721 day1.log
429039   6864552    123800090 day2.log
1185958 18975185   338653060 day3.log
1162803 18604776   330550972 day4.log
1157444 18519068   329710792 day5.log
1209289 19348537   342242234 day6.log
1078902 17262326   307343799 day7.log
6639476 106231028 1891835668 total
```

The wc command provides us counts of lines, words and bytes of each file. As you can see, the web log files are big as this is a very popular web server.

The log file format is the "standard" Apache "combined" format as follows:

```
#Fields: date time c-ip cs-username s-ip cs-method cs-uri-
stem cs-uri-query sc-status sc-bytes cs-bytes time-taken cs-
version cs(User-Agent) cs(Cookie) cs(Referer)
```

I have now to decide which fields to use and extract from the log files. I will use the following fields:

time: the time of the request
sc-bytes: a number that shows the server to client bytes
cs-bytes: a number that shows the client to server bytes
time-taken: the time —in milliseconds— it took the web server to process the request. Please note that a 0 value may declare that the requested resource was stored in a cache memory and therefore the web server did not have to process it.

The following UNIX shell script does what we want:

```
$ cat WWW.sh
#!/bin/bash

grep -v '^#' day1.log | awk '{print $2, $10, $11, $12}' |
sed 's/:/ /g' | awk '{print $1 ":" $2, $4, $5, $6}'
```

Its output, for the day1.log file, begins as follows:

```
00:00 137 465 0
00:00 142 471 0
00:00 13449 338 0
00:00 140 471 0
00:00 142 476 0
00:00 141 468 15
00:00 142 474 0
00:00 466 228 0
00:00 139 465 0
00:00 140 464 0
```

Of course, you have to change the day1.log string to fit your own filename. I did so for the rest of the web server log files. The files created are as follows (again using the output of the handy wc command):

```
$ wc *.data
 416033 1664132 6816604 day1.data
 429031 1716124 7026785 day2.data
1185942 4743768 19385103 day3.data
1162795 4651180 19041770 day4.data
1157440 4629760 18933110 day5.data
1209281 4837124 19748074 day6.data
1078894 4315576 17627914 day7.data
6639416 26557664 108579360 total
```

If you want to have header data in your files, you can do it by manually editing the output files. I put the "Time sc cs timeTaken" line at the beginning of each of the daily data files.

Now, we are finally ready to use R to process some of our data. I used the Misc ® Change Working Directory (or Command-D) option to change my working directory so that I will not have to use full paths for my data files.

First, I am going to use the *summary()* command to overview my day1 data.

```
> day1 <- read.table("day1.data", header=TRUE)
> summary(day1)
      Time              sc                cs
timeTaken
 18:05  :   775   Min.   :       0   Min.   :   0.0   Min.
:       0.0
 17:32  :   708   1st Qu.:     141   1st Qu.: 378.0   1st
Qu.:       0.0
 12:21  :   697   Median :     142   Median : 431.0   Median
:       0.0
 17:07  :   696   Mean   :    2997   Mean   : 428.9   Mean
:     253.3
 10:15  :   693   3rd Qu.:     842   3rd Qu.: 464.0   3rd
Qu.:       0.0
 18:15  :   687   Max.   :5686096   Max.   :2340.0   Max.
:1908734.0
 (Other):411777
>
```

You can easily see the moments that were very busy: 18:05, 17:32, 12:21, 17:07, 10:15 and 18:15. You can also understand from the timeTaken column output that your web server was serving requests pretty fast (because the 3rd Qu. value is 0).

There is also a very quick way to represent a data set graphically. It can be done with the *pairs(<dataset_name>)* command which plots pairs of the columns in a data set. The output of the

```
> pairs(day1)
```

can be seen in figure 3. Isn't it worth every statistical definition you have read in this article?

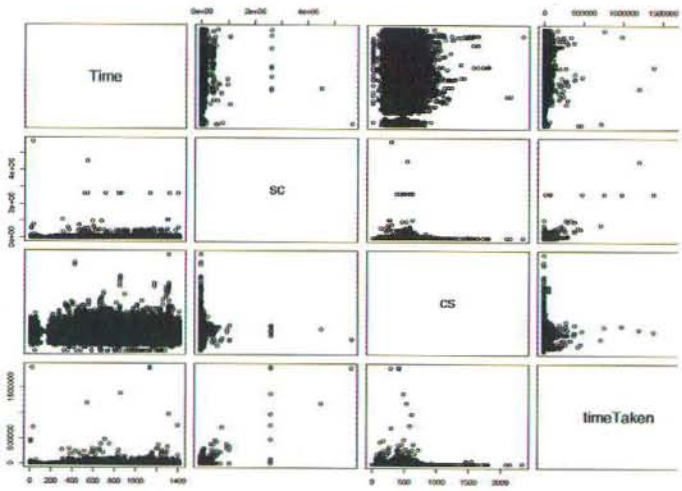


Figure 3: The output of the pairs(day1) command

seefile™
LIVE FILE SHARING+
ONLINE APPROVALS

WHAT IS THIS THING CALLED SEEFILE?

Affordable, Apache-based webserver software, accessible from all major Mac and PC browsers, for customer image reviews and approvals.

SeeFile lets you maintain private logins to different folders, and manages all permissions for uploads, downloads, previews, watermarks and messaging.

- pro photography
- prepress
- archives
- videos

www.seefile.com
30 day working demo available
call 1-617-262-2464 for reseller info

The *attach()* command takes a data set as its argument, and lets you use the columns of the data set separately. In this example, I will use the day2 data. Also, check the *objects()* and *search()* commands that help you discover existing objects.

```
> day2 <- read.table("day2.data", header=TRUE)
> attach(day2)
> objects()
[1] "day2"
> search()
 [1] ".GlobalEnv"         "day2"                "tools:RGUI"
 [4] "package:methods"    "package:stats"
"package:graphics"
 [7] "package:grDevices" "package:utils"
"package:datasets"
[10] "Autoloads"          "package:base"
> objects(2)
[1] "Time"      "cs"        "sc"        "timeTaken"
>
```

The *plot(Time)* command will produce figure 4. This figure shows the total number of connections per time. It makes sense that after midnight there are less connections than the rest of the day. On the other hand, unreasonable outputs may be the cause of a network attack.

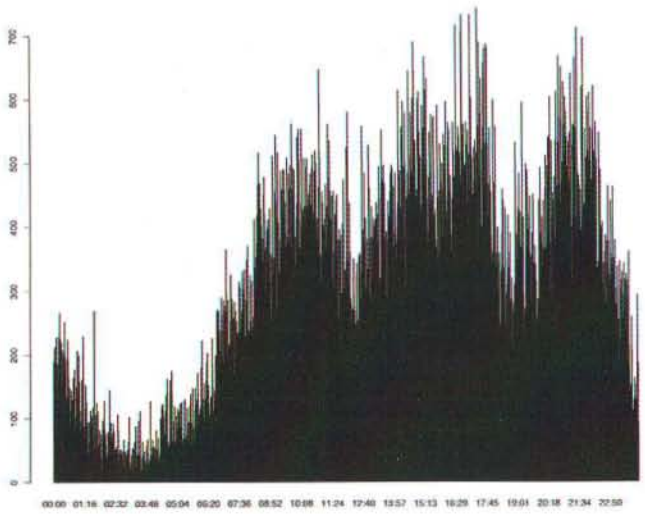


Figure 4: The output of the plot(Time) command

Last, imagine that you want to limit the output values for both x and y variables. You can do that by using the *xlim* and *ylim* parameters of the *plot* command. The following example shows this (the output can be seen in figure 5):

```
> plot(cs, sc, xlim=c(450, 500), ylim=c(450,500))
```

Network data example

In this example, I will use network data. As many of you already know, the usual way to capture network data is the *tcpdump* tool. The output of the tcpdump utility is difficult to read but there are many tools (i.e. tcpshow, ethereal/wireshark) that will help you parse it. Anyway, imagine that you have readable tcpdump output that contains the following fields:

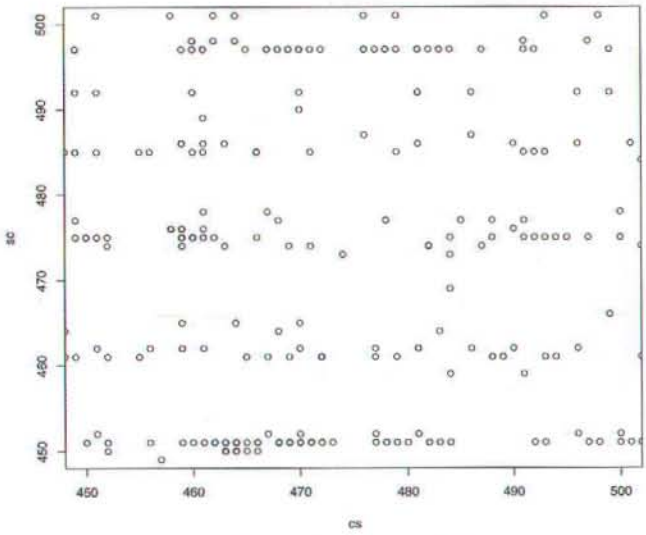


Figure 5: Limiting the values of the output

Packet Number: column title "Packet"
Time: column title "Time"
Time Difference from Previous Packet: column title "dt"
Source Port: column title "sp"
Destination Port: column title "dp"

I used the tcpshow package which produces output that looks as follows:

```
Packet 171
TIME:     15:00:15.367367 (0.000190)
LINK:     00:60:97:DE:54:36 -> 00:00:0C:04:41:BC type=IP
  IP:     207.46.130.139 -> 172.16.117.52 hlen=20 TOS=00
dgramlen=40 id=003A
    MF/DF=0/1 frag=0 TTL=64 proto=TCP cksum=C797
 TCP:     port http -> 1024 seq=1274940435 ack=3183900831
    hlen=20 (data=0) UAPRSF=010000 wnd=32735 cksum=2A2F urg=0
DATA:     <No data>
```

```
Packet 172
TIME:     15:00:15.455012 (0.087645)
LINK:     00:00:0C:04:41:BC -> 00:C0:4F:A3:58:23 type=IP
  IP:     172.16.112.20 -> 192.168.1.10 hlen=20 TOS=00
dgramlen=60 id=0080
    MF/DF=0/0 frag=0 TTL=63 proto=UDP cksum=9D5A
 UDP:     port domain -> domain hdr=8 data=32
DATA:     .9.........
    hostmaster.com.....
```

I used a small Perl script to extract the data (*TCP traffic only*) that I wanted from the tcpshow command output. Remember that you may have to replace text values like http, telnet, etc., found in tcpshow output with their service numbers so that R can use it.

This time, I will also bring into play a new R package for creating graphics called *lattice*. The following command shows how to load the lattice package in R.

```
> library(lattice)
```

In order to get some help about the lattice package, you can type the following command:

```
> help(lattice)
```

After executing the last command inside the graphical version of R, you will get the output shown in figure 6.

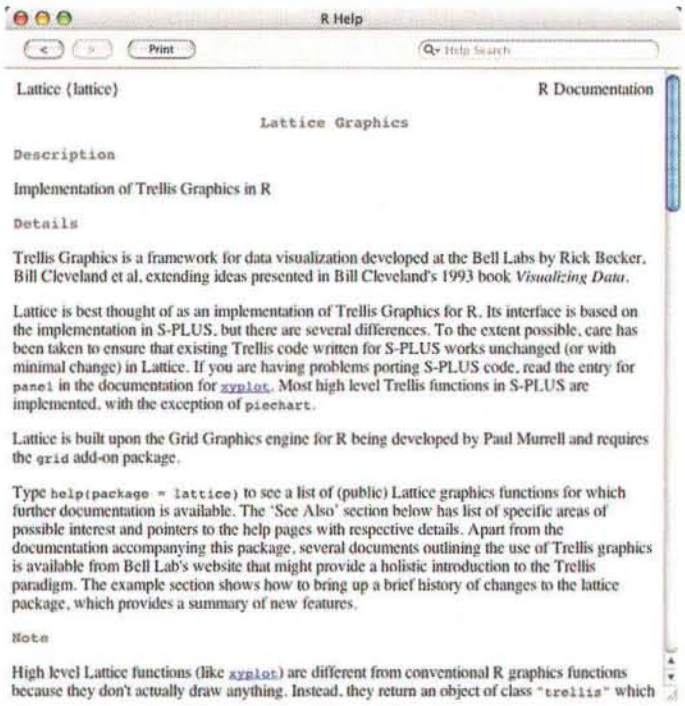


Figure 6: help(lattice) graphical output

For the first example, I will use the data from the first three columns (*Packet, Time,* and *dt*) of the extracted data (**C3.data file**). I executed the following three commands:

```
> c3 <- read.table("C3.data", header=TRUE)
> attach(c3)
> c3m <- as.matrix(read.table("C3.data", header=TRUE))
```

You already know the first command. The second command inserts the data as a matrix (***as.matrix()*** command) because some graphics functions that plot more than two variables will only accept data as a matrix. Do not forget to also run the ***library(lattice)*** command.

Write the following commands in a text editor. After that, copy them and paste them inside R. You will get figure 7! This example is based on an existing example that uses the *volcano* data set.

```
x <- 10*(1:nrow(c3m))
y <- 10*(1:ncol(c3m))
image(x, y, c3m, col = terrain.colors(100), axes = FALSE)
contour(x, y, c3m, add = TRUE, col = "peru")
axis(1, at = seq(100, 800, by = 100))
axis(2, at = seq(100, 600, by = 100))
box()
title(main = "c3m plot", font.main = 4)
```

Do not ask me about the physical meaning of that graph. If you know your data, you can tell more about this image. This is just an example about getting an idea of R capabilities.

Now, I am going to show you a more down-to-earth example. The following commands

```
> plot.new()
> xyplot(Packet ~ Time)
> title(main = "Packet vs Time", font.main = 4)
```

will plot Packet number versus Time —using data from the c3 dataset— as can be seen in Figure 8. Straight lines may

Save time... save money...
synchronize your databases

***fmSQL Synch* eliminates double data-entry... forever.**

You can now synchronize your FileMaker and web (SQL) databases. Data is compared on a *record-by-record* as well as *field-by-field* basis. Existing databases can be configured for synchronizing with just a few modifications.

Some of the features include:

- ✔ Eliminates double data-entry
- ✔ Two-way synchronizing
- ✔ Field level conflict checking and resolution
- ✔ Setup Assistant
- ✔ Creates all SQL statements for you automatically
- ✔ Easily integrates with existing FileMaker solutions

Download a demo, and get more information at
www.fmSQL-Synch.com

Garrison Computer Services
info@garrison.com.au Ph: +61 2 4575-5247
www.garrison.com.au PO Box 141 Windsor NSW 2756 Australia

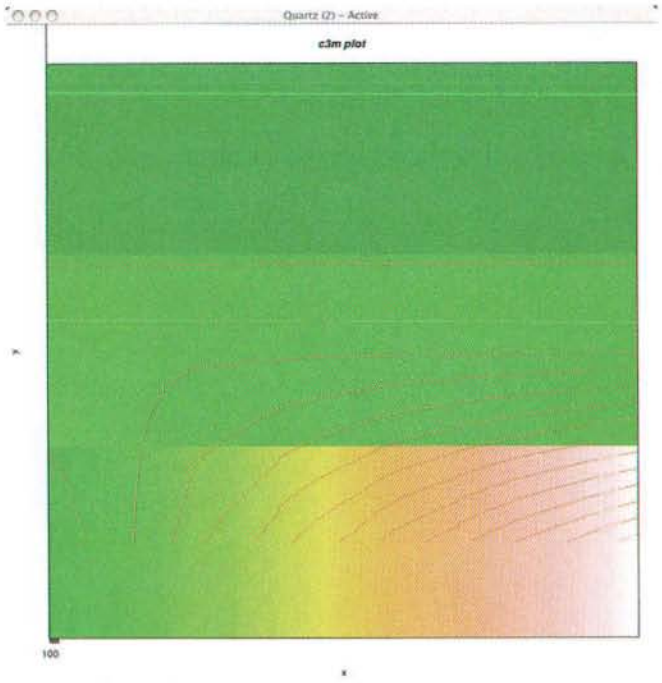


Figure 7: Plotting the c3m data set

represent complete HTTP transactions. You can see that there are moments that there is not so much TCP traffic whereas other times the TCP traffic is very high.

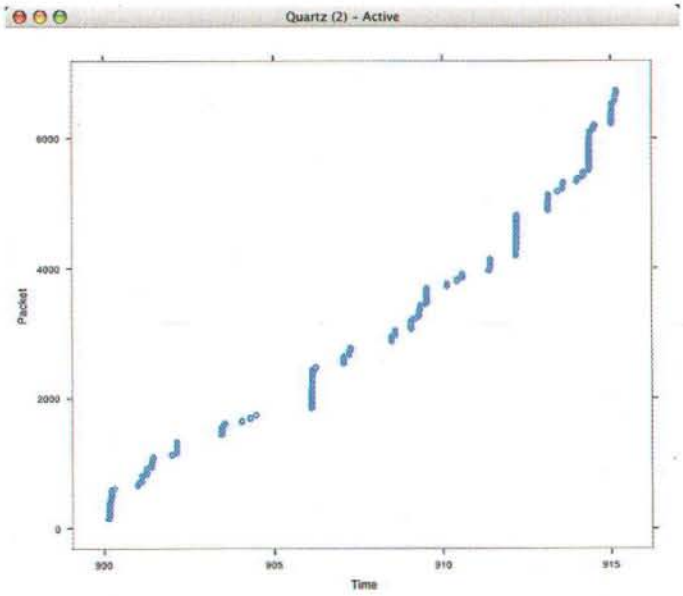


Figure 8: Packet vs Time plot

For the last example I will use the data from the last two columns (*sp*, and *dp*) of the extracted information (**C2.data file**). First, run the following commands:

```
> c2 <- read.table("C2.data", header=TRUE)
> attach(c2)
> c2m <- as.matrix(read.table("C2.data", header=TRUE))
> summary(c2)
       sp              dp
 http   :2472   http   :1923
```

MacResource
the.mac.resource

Wireless Products
Airport Cards
Extreme: $69.99
Standard: $199.99
Routers: $59.99

iPods Galore!
iPod Minis from $129.99
20 Gig from $159.99
30 Gig from $179.99
40 GIG from $199.99
60 GIG from $239.99

Parts for Every Mac System!

Logic Boards
G3/G4 PCI/AGP : $129
G4 Gigabit/D Audio: $199
G4 Quicksilver: $349
G4 MDD: $489
G3 iMac Logics From $69
G4 iMac Logics From: $199
G5 Towers.....Call
G4 Xserves $149-$299
G5 xserves $599

Power Supplies
G4 iMac 15/17/20: $79/$99/$119
G5 iMac 17/20: $149/$179
G5 Tower: $169/$199
G4 Qsilver/D audio:$179
G4 Gig E-net/MDD: $199
G4 AGP 208/237w: $179/$219
Logic board and power supplies require exchange.

G4/G5Processors
We carry Original Processors
for most G4s, G5s and Xserves
Call for best pricing

Thousands of parts in stock for all Mac systems!

1-888-Mac-Resource

www.mac-resource.com

Mac Systems
G4 733Mhz $599
G4 800Mhz: $649
G4 867/933Mhz: $899
G5 1.6Ghz: $899
G5 1.8Ghz: $1099
G5 1.8Ghz DP $1249
G5 2.0Ghz DP $1399

New Systems Arriving Daily! Call for latest Stock.

NEED G4, G5 OR INTEL IMACS?
iMac G4s $399,iMac G5 1.9Ghz 17" $999
1.8Ghz 17"/20": $859/$999
Intel Dual Core Demos from $849!!!

WE HAVE G5 XSERVES AND RAIDS EVEN IF APPLE DOESN'T!!!!
G4 XSERVES STARTING@ $SOLD OUT!!!!
G5 XSERVES STARTING @$1499!!!!
1 TB XSERVE RAIDS FROM $3499!!!!
2.8 TB XSERVE RAIDS FROM $4499!!!!
5.6 TB XSERVE RAIDS FROM $6999!!!!
3.5 TB/7.0 TB XSERVE RAIDS $6499/9599
RAID CARDS, FIBRE CARDS, DRIVE MODULES
POWER SUPPLIES, CONTROLLER MODULES ETC
, OVERNIGHT SERVICE AVAILABLE!!!!

Displays
REFURBISHED DISPLAYS
Apple 17" Studio LCD: $299
Apple 23" Cinema: $899
Apple 22" Cinema: $799
Apple 15-inch Studio LCD: $149
Apple 17" Studio CRT,ADC or VGA: $69.99
Products may be refurbished or demo, call for more informatio

```
smtp   : 202   smtp   : 223
telnet :  39   telnet :  42
1024   :  31   1024   :  38
2615   :  22   1306   :  36
1026   :  21   4233   :  27
(Other):2124   (Other):2622
```

As you can easily understand, the summary command is very useful and meaningful this time. This traffic has many HTTP, SMPT and TELNET requests. If you are concerned about security, you may try to lower the TELNET connections and replace them with secure connections (***ssh***).

As this sample contains non-numeric values, there are not so many things to do. Plotting your data set is something you can do (figure 9):

```
> plot(c2)
> title(main = "dp vs sp plot", font.main = 4)
```

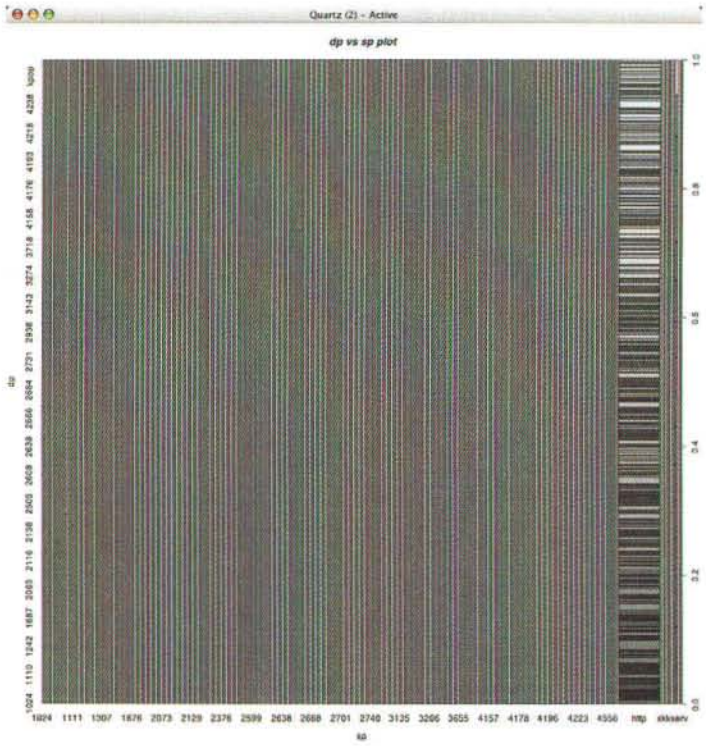


Figure 9: dp vs sp plot

One more thing

You may wonder by now why did I talk about web log files for seven days although I used only two of them! Well, the answer is that I am going to use them now.

Run the following commands for each one of the seven web log data files:

```
head -n 1 day1.data > hour1
grep "^13:" day1.data  >> hour1
```

This will create seven files, each of them containing the web log data between 13:00 and 13:59, one for each weekday. Also, execute the following command:

```
$ wc -l hour*
  25647 hour1
  23211 hour2
  70192 hour3
  67904 hour4
  59699 hour5
  60121 hour6
  58629 hour7
 365403 total
$ wc -l hour* > hour13.data
$ head -n 7 hour13.data > hour13
```

Now, let us go back to R and execute the following commands:

```
> hours <- read.table("hour13")
> attach(hour)
> barplot(V1, angle=c(45,135), density=20, col="grey",
names=c("Sunday", "Monday", "Tuesday", "Wednesday",
"Thursday", "Friday", "Saturday") )
> title(main="Web server connections from 13:00 to 13:59",
font=5)
```

The output can be see in Figure 10.

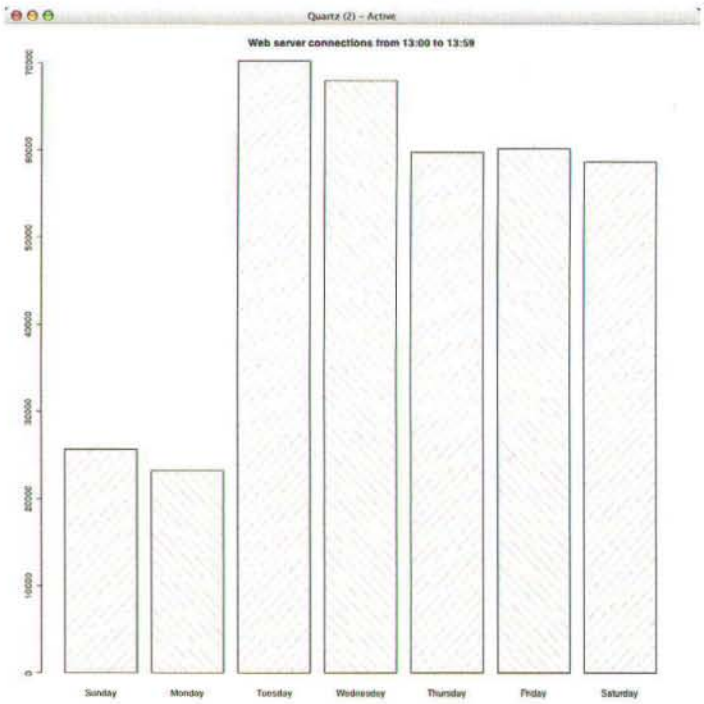


Figure 10: A bar plot

This procedure can be easily automated (and also run using ***cron***) and therefore you can have a report of your data every day at your email account!

What else can R do?

Now that you have learned more things about R, let me briefly tell you what else can R do. Well, R can also perform the following:

1. Advanced data analysis.
2. Advanced statistics.

3. R has an object oriented programming language that you can write your own programs.

Summary

In this article you learned a lot – you learned some basic things about R, how to import data into R, and how to create graphics with R.

Those things can be very valuable for regular users and, especially, for system administrators.

Conclusions

I hope that this article did not contain too much statistics. I also hope that you have, by now, understood some of the capabilities of R. If you want to learn more about R then visit its home page, and check out some of the proposed books.

The output of R should help you prove your points to either your colleagues or your manager and get a general overview of your data.

Please let me know if you have any questions or if you want another article about R and its rich graphical capabilities.

Bibliography and References

R home page: http://www.R-project.org/

S-PLUS home page: http://www.insightful.com/products/splus/default.asp

R and DBMSs page: http://developer.R-project.org/db/

Venables, W.N. and Ripley, B.D., ***Modern Applied Statistics with S***, 4th Ed., Springer Verlang, 2002

Venables, W. N., Smith, D. M., ***An Introduction to R***, Network Theory Ltd., 2002

Murrel, Paul, ***R Graphics***, Chapman & Hall/CRC, 2006

Crawley, Michael, ***Statistics: An introduction using R***, Wiley, 2005

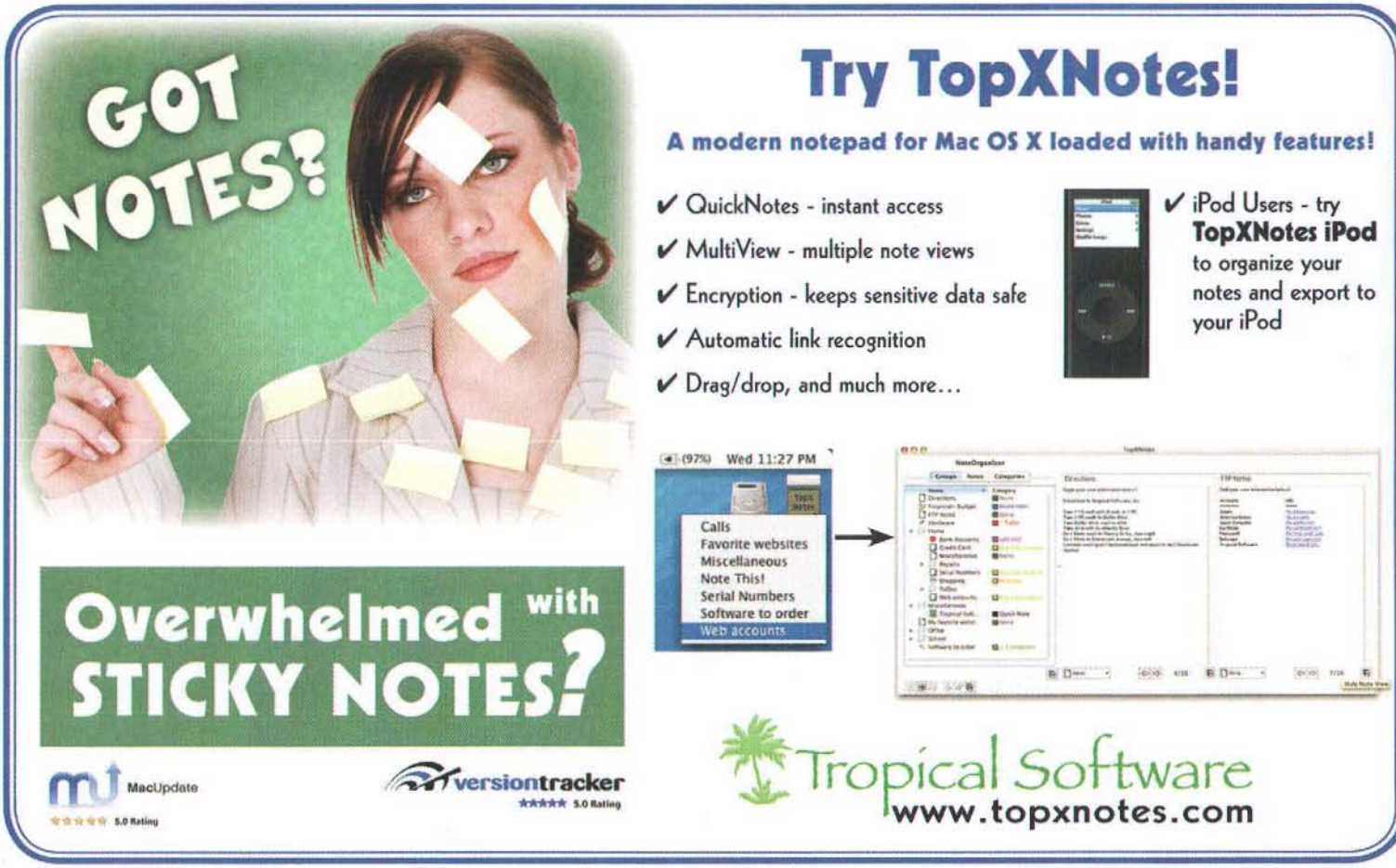
Dalgaard, Peter, ***Introductory Statistics with R***, Springer, 2004

Venables, W.N. and Ripley, B.D., ***S Programming***, Springer, 2004

Tom Christiansen and Nathan Torkington, ***Perl Cookbook***, 2nd Ed., O'Reilly, 2003

About The Author

Mihalis Tsouklos lives in Greece with his wife Eugenia and enjoys digital photography and writing articles. You can reach him at tsoukalos@sch.gr.



Translate Macintosh* MultiCore Power into Application Performance

Get your applications ready for parallel and scalable processing

Right the first time:

Intel® C++ Compiler for Mac OS* is a highly optimized compiler designed to handle the most demanding applications. Intel augments these compilers with advanced support for threading through OpenMP* and auto-parallelism capabilities.

Intel® Fortran Compiler for Mac OS* provides a fast and easy way to get maximum application performance for compute intensive applications. This compiler supports OpenMP* and auto-parallelism to take advantage of performance features available in the Multi-Core Intel® Processors.

Intel® Math Kernel Library for Mac OS* is a set of highly optimized, thread-safe, mathematical functions that reduces the need for hand-coding and allows developers to achieve outstanding performance for engineering, scientific and financial applications.

Intel® Integrated Performance Primitives for Mac OS* enable software developers to achieve maximum application performance and reduce development time. They provide highly optimized functions for math, graphics, multimedia, audio, video, speech, computer vision, image, cryptography and signal processing that have been heavily optimized for Intel® processors.

"We've been an Intel C++ compiler customer and are impressed with the results. We are encouraged by Intel's commitment to expand their software development tools to support the exciting new Intel-based Mac platform."

Kevin Tureski—Director of Engineering, Maya, Alias Systems

Custom Solutions
888.414.5846
http://www.cs-software.com/intel

Programmer's Paradise
800.443.9990
http://www.programmers.com/intel

intel Software

* 2006 Intel Corporation, Intel, the Intel logo, Pentium, Itanium, Intel Xeon and VTune are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. *Other names and brands maybe claimed as the property of others.

Automate Your Place, part 1

Have your Mac brew your coffee and take care of the lights on your way out

By Andrew Turner

Introduction

Like any good developer or power-user, you've been using the great tools that come with Mac OS X to automate much of your workflow. Applescript and Automator together allow you to rid yourself of repetitive tasks. You import, backup, convert, and markup your photos automatically. Data backups happen once per week, with incremental backups in between.

However, despite all this effort to make your computer work more efficient, safe, and hassle free you probably haven't really considered how much your Mac could be doing for you. Why restrict your automation to just the ***virtual*** desktop, why not also automate your ***real*** desk. While you're at it automate your office, house, store, garage, shop, or any other place where you have a Mac!

Seem a little too Sci-Fi? Just imagine that in the morning your alarm goes off. As you get out of bed your coffee maker begins brewing a fresh pot of coffee, your Mac wakes up, starts downloading your email, updates your news RSS feeds, opens iCal to the day's agenda, and plays some soothing morning music. Half-an-hour later your coffee maker automatically shuts off. As you pull out of your driveway your computer performs a backup of your files then goes to sleep. When you come home at night, your house knows that it's dark outside and turns on the porch and hallway lights for you. When you're ready to watch a movie you pull up FrontRow and the living room lights dim, the stereo turns on and your video starts playing. You could do the same thing to your shop, office, or garage. Save energy by turning off unused lights, know the state of your security system via a web-browser from your house, or get notified by email when someone enters your driveway. These are just some of the possibilities of an automation system powered by your Mac.

"Save energy by turning off unused lights, know the state of your security system via a web-browser from your house, or get notified by email when someone enters your driveway."

In this article we will introduce you to the current field of Location Automation in the Apple world, it's not just about your house anymore. Automation software has become more advanced, hardware more prevalent and robust, and the community has grown. We will show you how to get started, setup your environment, and connect to the community. In future articles, we will cover more in-depth topics such as writing complex scripts, web interfaces, homemade sensors, and notifications on your cellphone, email, or Skype.

A Whole World of Options

There are two main components of the automation system: automation devices, and the management software that will connect to all these devices and allow you to create your scripts and settings.

Hardware

When home automation became really popular several years ago, everywhere you looked there were ads for X-10 devices. More often than not, the advertised systems were camera systems that had little to do with the X10 standard associated with automation systems. However, the ads made the term X10 known to most computer users. X10 is a standard communication system developed in 1975 for remote control of devices in a home or building. This standard is known for sometimes being unreliable as the communication between the controlling computer and the devices is dependent on the quality of the wiring in the building.

miniStack™ V2

Your Mac's® 'Better Half'

NEW! *Ultra-Quiet Operation*

miniStack™ V2 Firewire™ & USB Drives

Compact yet powerful with up to 750GB disk space and powered FireWire and USB2 hubs – the perfect external storage/connectivity solution for ANY Mac! 80GB to 750GB From $99.00

"Add Your Own Hard Drive" 0GB kits From $53.99

www.MacSales.com/**ministack**

ADD PORTS!

GOLD HONOREE

Other World Computing

Serving the Computer Universe since 1988

Visit www.MacSales.com 800.275.4576

G3/G4 iBook® and PowerBook® Batteries

Up to 62% more capacity!*

with **NuPower** batteries by newertechnology

From $99.95

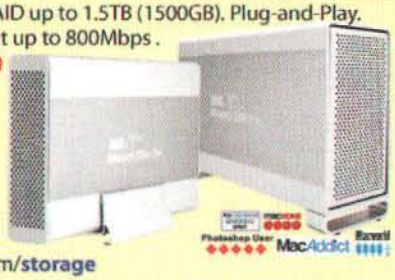
Higher Capacity Battery Options for every PowerBook and iBook made since 1998.

www.MacSales.com/**powerbook**

OWC Mercury™ Elite-AL Pro FW/USB Drives

Single and Dual RAID up to 1.5TB (1500GB). Plug-and-Play. Ready to transfer at up to 800Mbps.

From $109.99



www.MacSales.com/**storage**

SuperDrive Your Mac

External FireWire/USB2 Solutions From $99.99

for G3/G4/G5 Desktop & Tower Macs From $29.99

for PowerBook G4 From $119.99

for iMac® G5 From $129.99

for Mac mini From $119.99

www.MacSales.com/**superdrives**

Memory

Certified Mac Pro Memory

2GB Kits **$429.99**

4GB Kits **$929.00**

Up to 16GB!

MacBook™ & MacBook Pro Memory

512MB From **$65.00**

1GB From **$125.00**

Up to 3.0GB Max!

www.MacSales.com/**memory**

TRUE APPLE QUALIFIED PRODUCT!

The RIGHT memory in stock for Apple® Intel®-based Macs. All OWC memory guaranteed and backed by a LIFETIME advance replacement warranty.

iPod® Accessories

Batteries Don't let a weak battery get in the way of your groove time. Increase your capacity up to **114%**** with a NuPower iPod Battery!

From **$19.99**

Protection Prevent damaging your investment with iPod cases. From $4.99

NuPower SHIELD

On The Road Listen to your tunes while driving! FM transmitters. From $9.95

www.MacSales.com/**ipod**

*For Apple PowerBook G3 Lombard/Pismo models. Up to 62% more capacity than stock Apple battery. **For iPod Photo and iPod 4th Generation models. Up to 114% more capacity than stock Apple battery. M1_01-07 Prices, specifications and availability are subject to change without notice. Items returned within 30 days may be subject to a restocking fee. No return will be accepted without Return Merchandise Authorization number.

Mercury is a trademark of Other World Computing. Intel is a registered trademark of Intel Inc.

NuPower is a registered trademark of Newer Technology, Inc. miniStack, TRAFFICJamz, & ViDEO+ are trademarks of Newer Technology, Inc.

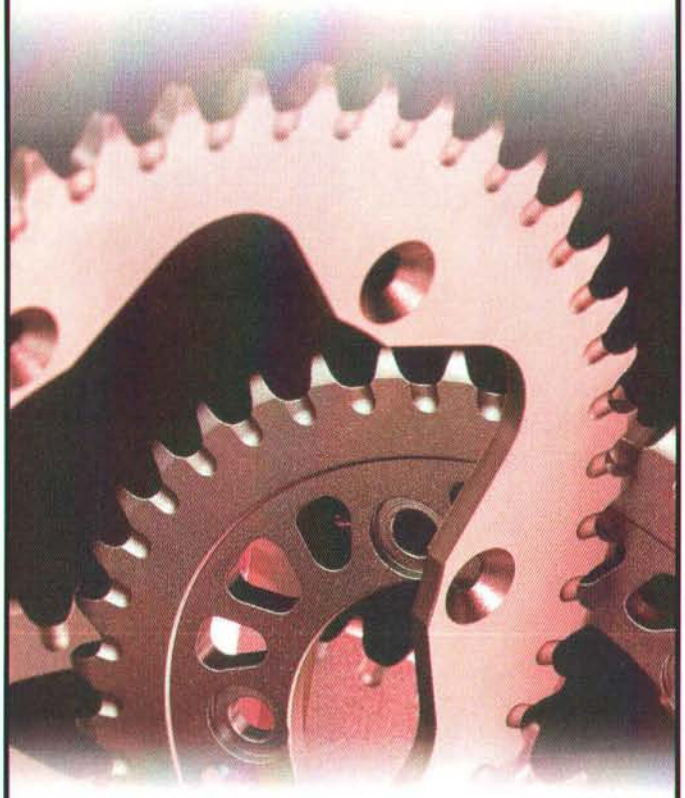
Apple, iBook, PowerBook, Mac, & iPod are registered trademarks of Apple Computer Inc. FireWire, & MacBook are trademarks of Apple Computer Inc.

Order Now

www.MacSales.com

macforge.net™

MacForge indexes and tracks open source projects that run on the Mac, or are likely to without modification. Thanks to MacForge, there's no need to sift through huge listings of open source that you can't use. With categories, filters, and more, MacForge makes it easy to find what you need.



MacForge:

Your Gateway to Mac Open Source

www.macforge.net

Sponsored by MACTECH

Recently, several more robust standard have begun to emerge to address the frustrations and shortcomings of X10. Most are still in the standards formulation and beta release stage. These include Zigbee, UPB, WiMax, Z-Wave, and HomeRF.

One technology that very has been recently released and gained widespread use and support is INSTEON, which was developed by SmartLabs Technology. INSTEON couples the traditional powerline communications with redundant mesh-networking to speed up response times as well as add state verification.

"Utilizing a wireless transceiver, you can turn control devices or send commands to your Mac using key fobs and small control pads."

These techniques are implemented to provide users with a hopefully more enjoyable and reliable automation system.

A benefit of the new INSTEON system is that it is backwards compatible with the older X10 devices. This allows current users to slowly upgrade their existing X10 automation systems to INSTEON, and new users purchase the newer INSTEON controller and then purchase INSTEON or inexpensive X10 modules as necessary for your location. For this reason, in this article we will design our automation system using the INSTEON modules. Readers can apply the same techniques to older X10 components.

There are 3 key hardware pieces required for the simplest automation system: controller, signalinc receivers/repeaters, and a device module. We suggest you look at buying starter packages from a vendor (see Resources) to start off your automation system. An INSTEON starter package will cost about $130 USD.

The controller connects to your Mac via USB and plugs into an electrical socket on the other end. The controller will send and receive signals from the INSTEON devices at your location. If you're on a budget, you can stick with an X10 controller like the PowerLinc 1132CU, which is USB and therefore doesn't require a USB to Serial cable. The PowerLinc also has good support with most of the available Mac software packages.

The SignaLinc receiver/repeater are new devices that provide the INSTEON signal repeating and mesh-networking redundancy. The Signalincs come in a pair, and plug into wall sockets around your location. They also have small antennas and will need to be setup so that the pair can communicate wirelessly through your walls.

The device module can be a lamp dimmer or appliance controller (on/off). These modules plug into a wall socket, and then you plug the lamp or appliance into the module. You can then turn the device on by using the

appliance's own power switch, by using your Mac, a control pad, or INSTEON switch. Additionally, a device module can be a sensor such as a motion detector or window sensor. For a less apparent automation system, instead of an external module, you can get a wall socket that will replace your current socket.

Other typical pieces of an automation system are switches, button controllers and control pads. These devices have the benefit of looking and operating like normal wall switches and power controllers while also hooking into your automation system. A control pad plugs into a wall socket via a cable, or communicates wirelessly. It is a good idea to have at least one control pad that provides direct control of your hardware devices. That way if your Mac is turned off, out of commission, or you need to debug your home automation system, you can use the control pad.

In addition to the basic devices discussed above, it is possible to tie in a HVAC (heating ventilation and air conditioning) controller, security systems, sprinklers, house sensors, theater systems, and cameras.

For wireless interface, it is possible to get a wireless transceiver. Utilizing a wireless transceiver, you can turn control devices or send commands to your Mac using key fobs and small control pads. Additionally, the wireless interface will detect commands from motion detectors and magnetic switches like the DS10A, and they will show up like X10 devices.

The W800-RF32 is a well-supported wireless interface that plugs into your Mac. Because the W800 is a serial device, you will need a Serial-to-USB converter. The Keyspan adapter is an affordable and very well supported option. Using the W800 you can receive signals from wireless door sensors, or wireless remotes inside and around a house or office.

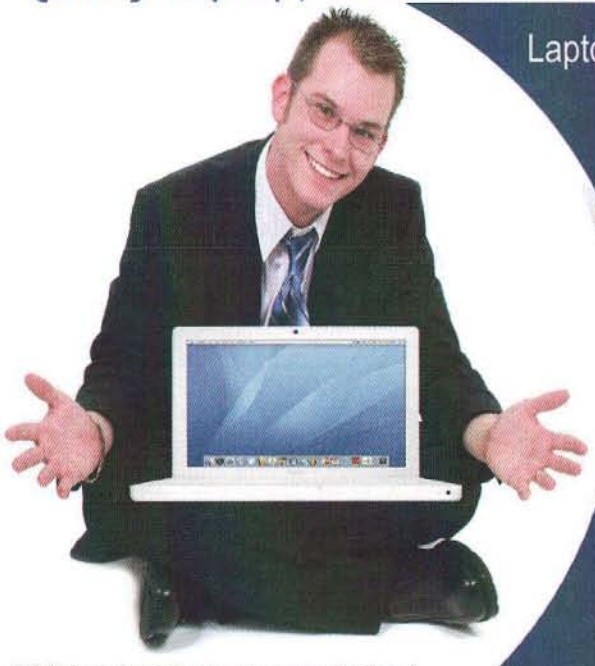
Look at an online automation vendor for other device options. Also, X10 has been sold under a variety of other branding labels, and these devices are often found inexpensively online or local stores. In particular, the Black & Decker Freewire system provides outdoor X10 plugs, and a wireless remote interface that is great for controlling holiday lights or other external devices. Radio Shack also carries home automation devices that work with X10, and therefore INSTEON systems as well. This can be a great place to quickly pick up devices rather than waiting for that box in the mail.

Software

Once you have your hardware in hand, you will need a way to control and read all your devices. Automation software runs on your Mac computer and allows you to setup triggers, groups, and scripts to give some intelligence to your automation system. Without a software controller you are limited to simple control of devices and small groups of devices.

There are currently 5 software options on the Mac: Perceptive Automation's Indigo, Sand Hill Engineering's

Quality Laptop, iPod® and Mobile Power Parts at Unbeatable Prices!



LaptopsForLess.com is your online source for...

- Laptop Batteries & Adapters
- iPod Batteries & Adapters
- PSP Batteries & Adapters
- PDA Batteries & Chargers
- Projector & RPTV Lamps
- GPS Receviers
- Digital Camera Batteries
- Tons of Accessories!

Wide selection of Mac and iPod replacement power products!

Laptops for Less

Visit LaptopsForLess.com Today!
www.LaptopsForLess.com/mt
or Call 1-800-556-4490

Mac Tech Readers Save 10% - Discount Code MAC10

® iPod is a registered trademark of Apple Computer Inc.

XTension, AlwaysThinking's ThinkingHome, Findley Studios' HomeRun, and the open-source MisterHouse.

MisterHouse is an open-source option that is built on Perl. It runs on all the major OS's: MS Windows, Linux, and Mac OS X. The scriptability of MisterHouse is very powerful, and the entire underlying system is exposed for the user to tweak as desired. However, the learning curve is somewhat high, and INSTEON support is starting to emerge, but not solid yet.

XTension has long been a well supported and very reliable Mac automation solution. It has been developed and supported for over 10 years, and includes many interesting features. In addition to the normal configuration and control of devices, XTension allows users to configure their own layouts and switches in the client views, and the ability for multiple XTension instances to communicate with one another over a network. It also offers a unique capability to utilize multiple controllers, which is useful for dealing with bridging different power legs in buildings. Lastly, XTension has a large AppleScript dictionary for users to write their own logic, and good integration with web cameras.

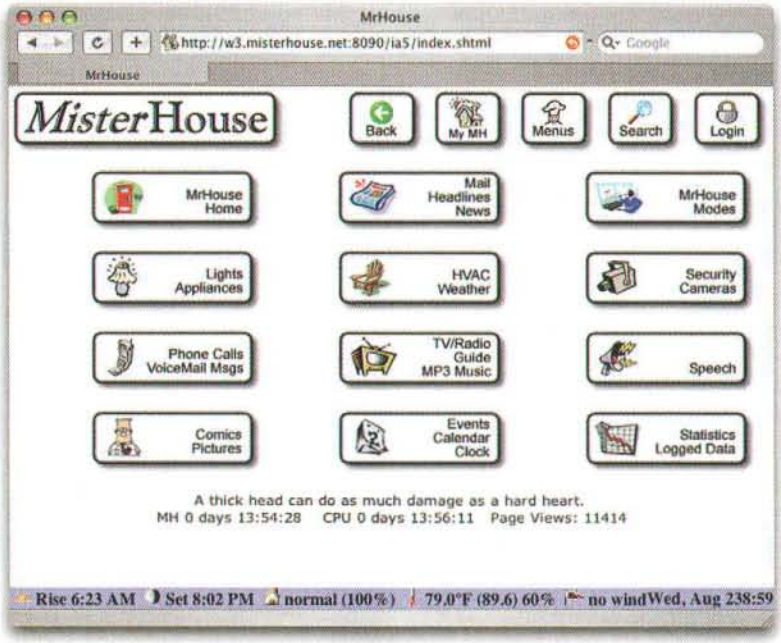


Figure 1: MisterHouse offers a lot of features and configurability, but has a steep learning curve

The developers of Xtension, Sand Hill, evaluate new technologies before necessarily implementing them. Their philosophy is that a critical component of the automation system is reliability. Therefore, their releases and feature updates are less frequent than other automation software options. Sand Hill also maintains a very extensive list of tutorials and information on automation systems and is definitely worth reading for learning more about the subject.

Perceptive Automation's Indigo was upgraded recently to a version 2.0 with a large list of new features, including, foremost, that it is a Universal Binary, so it will run natively on your new Intel-based Mac. Indigo supports X10 and INSTEON controllers, utilizes Client/Server architecture, so it's easy to control your automation system from a remote computer running just an Indigo client. For additional remote control, there is a very configurable web interface, and Dashboard widget, and very active community and forums to help you set it all up. Using the web interface, you can quickly control your automation system from anywhere in the world (disclaimer: the author developed the web interface and widget, and the source code is available under an open-source license). Indigo is available as an unrestricted 30-day demo available at Perceptive Automation's website.

ThinkingHome, and HomeRun all provide adequate interface to X10 controllers, with varying levels of scriptability, interface, and overall features. Unfortunately, these three options don't appear to be actively updated, though they're still available for trial. They're also only available for PPC and not as Universal Binaries.

This was a quick run down of the various automation software solutions available on the Mac. Due to the active development and support of Indigo, as well as the ease of use, support of Mac technologies, and impressive list of features, we will be discussing Indigo in more depth in our next article.

Putting it Together: Designing your Automation System

Now that we've covered the different pieces you will need to automate your place, lets design a system. For the purposes of this example, we will use a small office (homes are typically used, so lets turn it around). Besides, the example could easily be inverted and applied to a home, workshop, or home office.

First thing to do is to list the devices you will want to control with your automation system. Lets say: coffee maker, overhead lights, desk lamp, door and window closures, and a stereo system. Additionally, we want to integrate the system with our existing switches to keep the transition to an automation system transparent to other members of the office. Just like SAF (Spouse Approval Factor) there is such as thing as Co-worker Approval Factor (CAF). Based on this list, we will need to determine our "Bill of Materials" to order from an automation store. We will also use this list to record the device addresses of our modules for later programming into Indigo.

This is just a suggested system, and you're free to choose and configure the devices as you see fit. Our

BookEndz®

DOCKING STATIONS FOR APPLE COMPUTERS

Convert your MacBook Pro®, MacBook®, PowerBook®, or iBook®
into a desktop in seconds without misplacing cables or damaging connectors.

15.4" MacBook® Pro Docking Station

- Aluminum Plate helps in cooling of notebook
- Connectors are routed to rear of Dock
- MagSafe® Housing prevents accidental disconnect

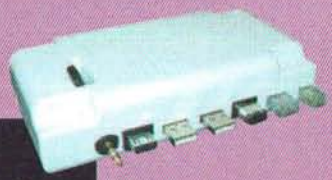
13.3" MacBook® Docking Station

- Also available in Black
- 5 USB 2.0 compliant ports (4 port powered or unpowered hub, DC adapter included)
- Built in DVI/VGA full size
- Gigabit Ethernet RJ45

17" PowerBook® G4 Docking Station

12" PowerBook® Docking Station

15" PowerBook® G4 Docking Station



iBook® G3/G4 Models Docking Station

Visit our website for latest product announcement www.BookEndzdocks.com

BookEndz®
Manufactured by Olympic Controls
1250 Crispin Drive • Elgin, Illinois 60123 • USA
Phone: 847-742-3566 • Fax: 847-742-5686 • Toll Free: 888-622-1199
E-mail: Sales@BookEndzdocks.com

Table 1: Components for a Sample Office Automation System

Component	Device
Computer Interface	PowerLinc/SignalLincs
Coffee Maker	ApplianceLinc
Overhead light switch (2)	SwitchLinc
Desk Lamp	LampLinc
Stereo	ApplianceLinc
Doors, windows (6)	Powerflash or DS10A
Wireless transceiver	W800-RF32

example office is just a general example of a simple system that utilizes the principal parts of an automation system.

Summary

We just covered the basics and options of an automation system with your Mac. The automation software available for your Mac allows unlimited customization, and hardware and interfaces are plentiful for whatever you want to control or sense. In our next article, we will setup an automation system for a small office/workshop, setup modes, a web interface, and notifications.

Resources

Vendors

SmartHome - http://www.smarthome.com
FunForGeeks – http://funforgeeks.com

Software

Indigo - http://www.perceptiveautomation.com
XTension - http://www.shed.com/
MisterHouse - http://misterhouse.sourceforge.net/
ThinkingHome - http://www.alwaysthinking.com
HomeRun - http://www.findleystudios.com/homerun

Resources

XTension Mailing List -
http://lists.shed.com/mailman/listinfo/xtensionlist
Indigo Forums -
http://www.perceptiveautomation.com/phpBB2/index.php
comp.home.automation -
http://groups.google.com/group/comp.home.automation

About The Author

Andrew Turner is an independent software developer and technology integrator who has built robotic airships, automated his house, designed spacecraft, and in general looks for any excuse to hack together cool technology. You can read more about his projects at www.highearthorbit.com.

There's a better way to surf the Web

Create your own experience with **Opera**

OPERA software

Download the free Opera browser at www.opera.com

by Edward Marczak

On Logs

Everything you need to know about your system

Introduction

Log files are the heartbeat of your system. You can track what's going on in good times and bad – the latter hopefully pointing you to a way to make things right again. When I say 'heartbeat', however, I should be clear that it's really many hearts. All of the child processes jabbering away, speaking their part. This article aims to teach you how to read logs, show examples, explain the various log contents, and give some logging tips and tricks.

Log in the Shell?

Now, logs may not be a shell topic per se, they're often associated with work in the shell, and perhaps for good reason. On an OS X box, you have the excellent Console.app (/Applications/Utilities/Console.app). It gives you quick access to most important log files, provides quick searching capabilities, and will automatically decompress gzip-rolled logs. Plus, you don't need to open a shell just to access your logs, if that sort of thing bugs you. Additionally, on an OS X Server, the Server Admin application accesses various logs depending on context. While Server Admin is useful for a quick peek, it uses an HTTP call to pull down the log files at appropriate intervals. Due to this, it's not a good way to watch a file fill up quickly. This brings us back to the shell.

Longtime readers of this column already know where I'm heading with this: we're going to run Terminal.app and be looking at logs through a command-line interface. So, open it up now (/Applications/Utilities/Terminal.app).

Log Central

How do entries in log files appear? This may seem to be a simple question, but it isn't. A log is simply a text file. This text file runs in chronological order, with new entries appended to the end. Any application is certainly capable of performing this on its own, and sometimes, that is the case. More commonly, though, log entries will be logged to the syslog daemon, which in turn is responsible for writing the entries to the proper log or logs. Interestingly, but perhaps not surprisingly, Apple has their own logging facility intended to replace syslogd. In fact, the little secret here is that syslogd is the Apple System Log in disguise.

The Apple System Log, or 'asl' is a syslog-compatible replacement for standard syslog (which deviously is named 'syslogd'). Fortunately for everyone involved, you can still treat it just like syslog, which I will tend to do here.

Programs use an API to write log entries to the syslogd server. As the suffix may clue you in to, syslogd runs as a daemon in the background. As of 10.4, it's initially run, and subsequently controlled from launchd. Of course, applications are free to just drop a text file somewhere and write to it.

Fluency

Let's take a look at a typical log entry. We'll start out easy:

```
Nov  6 06:54:40 Jack-Kerouak lookupd[1775]: lookupd (version
369.5) starting - Mon Nov  6 06:54:40 2006
```

This is, of course, one long line, but you should get used to it. Often, log lines will wrap – on paper and in your terminal. Each line is read left to right, as you'd expect. Let's pick this entry apart:

Nov 6 06:54:40 – The date and time that this entry was logged. Do note that this is a 24-hour clock ("military time"). Also, read on for a note about GMT entries.

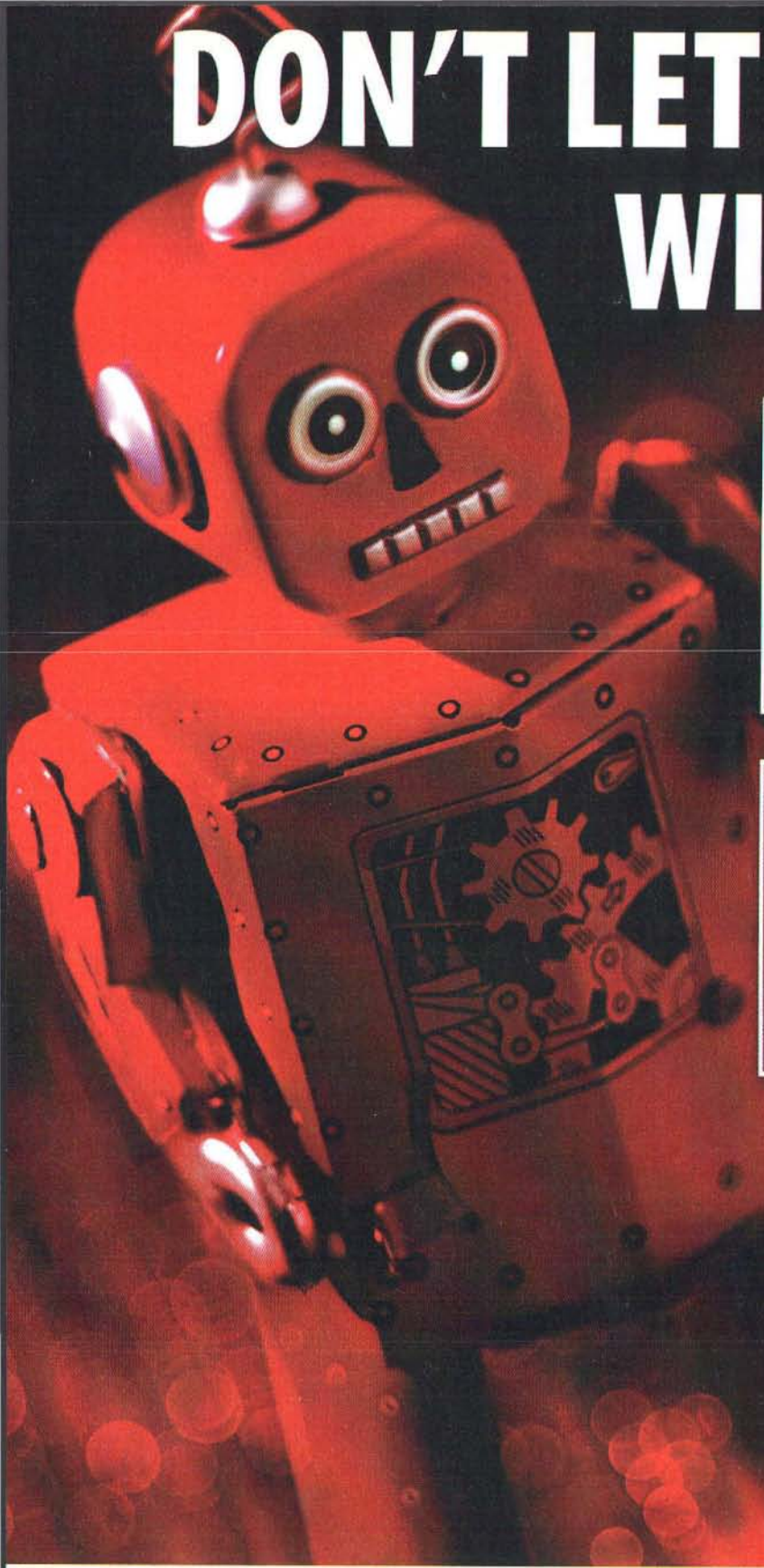
Jack-Kerouac – The hostname of the system that logged this entry. Jack-Kerouac is the name of my PowerBook as I'm often 'On the Road'.

lookupd[1775] – The name and process id or pid that sent the message to the log.

lookupd (version 369.5) starting - Mon Nov 6 06:54:40 2006 – The message itself. This is a simple, "hey, I'm starting up" message.

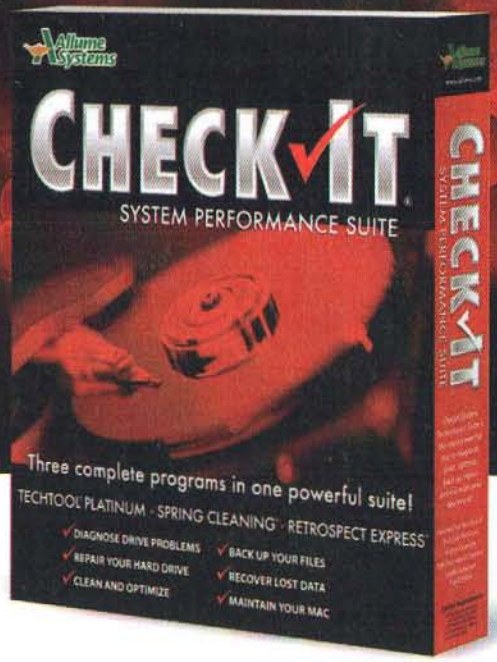
That was easy, right? The time is an obvious one: you need this to figure out the sequence of events, or, correlate log events with some other happening – be it electronic or real-world (like a power outage, etc.). Why do we need the hostname? If we're looking at the entry in a log on a particular system, it came from that system, right? End of story, no? Fortunately, no. syslogd can be set up to accept log entries from other machines and devices. This can be incredibly useful, but only if you know the host that's creating the message!

DON'T LET YOUR MAC WIND DOWN!



CLEAN UP YOUR MAC
UNINSTALL APPLICATIONS
BOOST PERFORMANCE
REGAIN LOST DISK SPACE

INCLUDES FULL VERSIONS OF:
TECHTOOL PLATINUM
SPRING CLEANING
DANTZ RETROSPECT EXPRESS



Allume Systems

A Division of Smith Micro Software

Available from your favorite retailers and catalogs. Learn more about CheckIt at Allume.com!

CheckIt System Performance Suite is the most powerful tool to diagnose, clean, optimize, back up, and repair your Macintosh!

®, TM, and © 2006 Allume Systems, Inc. Mac OS X 10.3 or higher is required.

The next entry is the process name and process id that sent this message. While the process can set any name it likes, the syslog daemon is responsible for logging the pid that sent the message. Having the pid is interesting: some processes are long-lived, and you can easily correlate a log entry with a pid. Some processes are very ephemeral, and will have wisped away before you can hunt them down based on their pid. Also, if you're looking at an aged log, don't rely on the pid! Process IDs come and go, and may be recycled. Don't look at yesterday's log and try to line up events with pids – even from the same process. These entries may be hints, but until you have good evidence, they should be considered suspect.

Finally, we have the message, or, what the program is trying to tell you! Of course, this depends on the situation. In my example, lookupd is just letting us know that it is starting up. It's simply informational.

Who's on First?

Where does one find logs to watch? On a typical Unix system, you'll find all of your logs under one neat hierarchy: /var/log. As is typical for Apple, however, you'll find all of your Unixy logs in /var/log as you may expect, Apple-fied logs under /Library/Logs, and user space logs in each user's ~/Library/Logs directory. Wow. That's a lot of logs.

My example entry above came from /var/log/system.log. system.log is as close to the heartbeat of the system as possible with one log. Consider it the log. Of course, that viewpoint depends on what you're trying to troubleshoot. That said, I do like leaving system.log up in my face as much as possible. It's a great way to pick out issues before they cause havoc.

Which Way Did They Go?

For apps that log through syslog, how does syslog know in which logs to write each message? For that, you need to consult /etc/syslog.conf. This plain-text configuration file for syslog follows some very standard conventions. Lines beginning with a hash ("#") are ignored, and don't contribute to the configuration. The "*" is a wild-card, and can match multiple facilities. Repeating designations and specifying different log files.

One of my first articles for MacTech detailed syslogd, its conventions, how to get it to accept remote messages and how to get it to write messages to various log files. It's now on-line at http://www.mactech.com/articles/mactech/Vol.20/20.12/UnixTipsForOSX/index.html. One of the few things in that article that needs updating for 10.4 is how to get syslogd to allow remote messages to be logged. We had an article earlier this year that details this procedure, so I won't go into the detail that he did. For the sake of completeness, though, I'll give you the walkthrough. Remember: you do not need to do this to follow this article. You would typically only do this on a server that is up 24x7 and will centralize logs for an entire LAN or enterprise. With that out of the way:

1. Edit/System/Library/LaunchDaemons/com.apple.syslogd.plist

2. Add "-u" to the ProgramArguments key, making it look like this:

```
<key>ProgramArguments</key>
        <array>
                <string>/usr/sbin/syslogd</string>
                <string>-u</string>
        </array
```

3. Save the file

4.Reload syslogd:

```
# launchctl unload
/System/Library/LaunchDaemons/com.apple.syslogd.plist
# launchctl load
/System/Library/LaunchDaemons/com.apple.syslogd.plist
```

5. While that gets it going immediately, something wreaks havoc with it during the nightly cron routines. To counteract this, simply unload and load syslog each night in a script. Create /etc/daily.local and add the following lines:

```
launchctl unload
/System/Library/LaunchDaemons/com.apple.syslogd.plist
sleep 2
launchctl load
/System/Library/LaunchDaemons/com.apple.syslogd.plist
```

6. Save this file.

7. Mark /etc/daily.local executable:

```
sudo chmod 744 /etc/daily.local
```

8. Now you're done!

Again, this is just the how. For the 'why', please reference Aaron's article.

Watching the Detectives

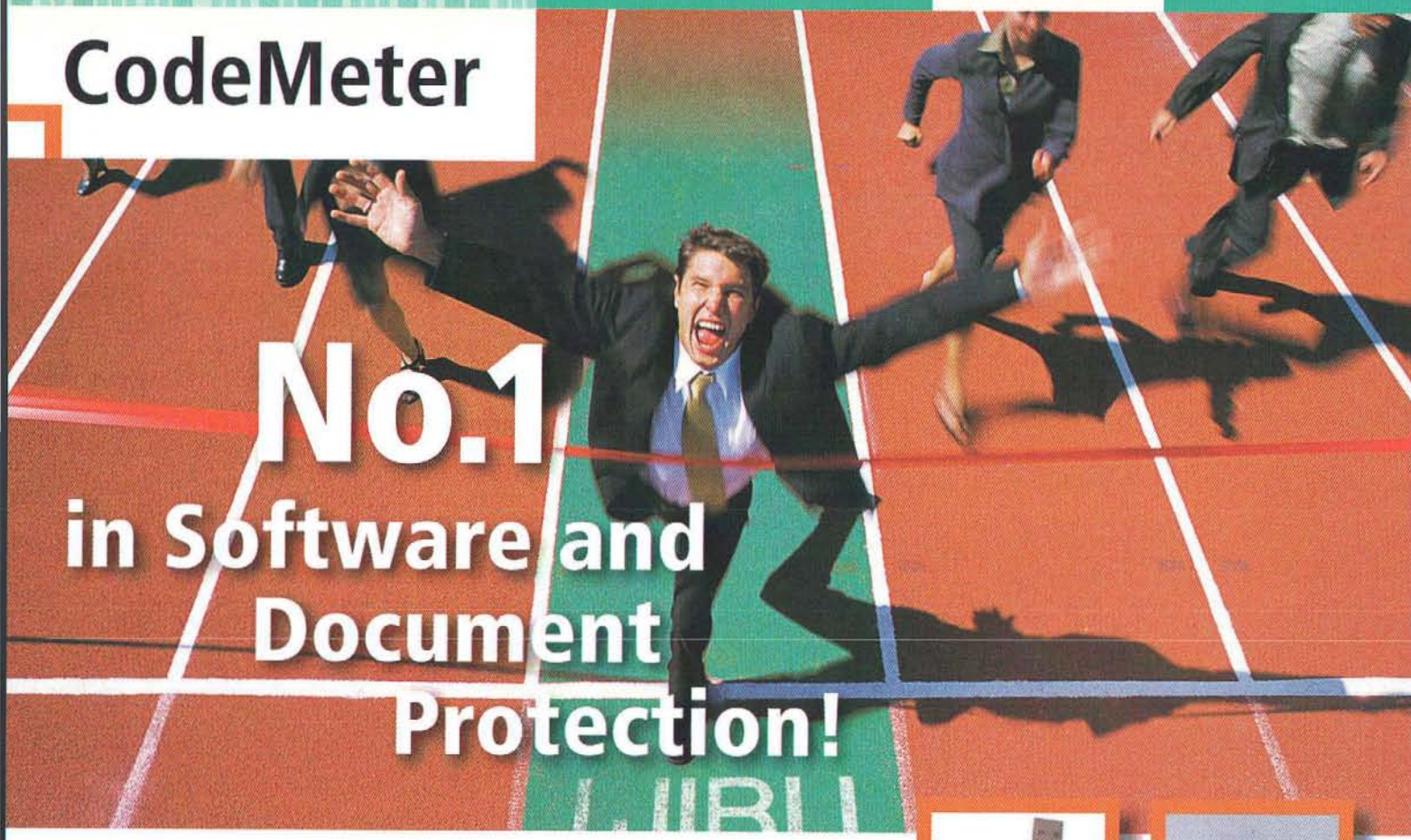
So, how does one watch a log? As alluded to earlier, there are several ways. There's the very excellent Console.app. Of course, earlier, I listed reasons why I prefer the shell for such a task, so that's what I'll be covering. There are three distinct programs that let you follow what's going on with a log file.

First, there's the ubiquitous `tail`. `tail` displays the last lines of a file – 10 by default. More importantly, you can use the '-f' switch to have tail follow the output of a log file in "real-time". I put that in quotes simply because there's always a delay between when an app performs an action and posts a log entry, to the time when it actually shows up. That said, `tail` is about the best you can do. A listing in print will just not do this justice: you need to see it in action yourself. So, please, open an admin shell, and run:

```
tail -f /var/log/system.log
```

You'll initially see the last 10 lines of system log, and then, as new entries are posted, the display will add them to the listing.

CodeMeter



No.1 in Software and Document Protection!

Highest Security

- Vendor selectable secret and private key
- Strong encryption algorithms with AES 128 bit and ECC 224 bit
- Best-in-class tools for automatic protection (envelope, no source modification) for Win32, Win64, .NET, Java and MacOS X Universal (PPC, Intel)

Best Flexibility

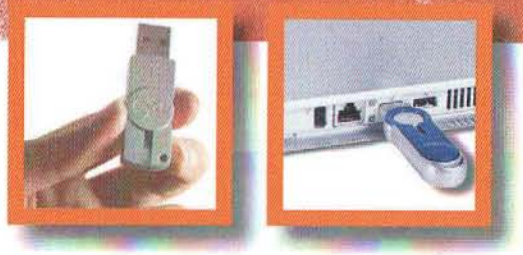
- More than 1000 independent licenses can be protected by one CM-Stick
- One versatile hardware key for all license models including floating network licenses
- Multi-platform support including Windows, MacOS X and Linux

New Distribution Channels

- License transfer by SOAP based CM-Talk or file based Field Activation Service in eShops
- Multiple purpose, including protecting low cost software and also content

Unique End User Advantages

- First and smallest dongle with up to 2 Gbyte Flash Disk
- No drivers necessary – can be used without admin rights
- CM Password Manager, secure virtual drive and secure login



The very highest quality by WIBU-SYSTEMS!
More than 3000 applications developers and creators of intellectual property trust in WIBU-SYSTEMS solutions since 1989.

Order your Free Software Development Kit now!
Phone 1-800-6-GO-WIBU | order@wibu.us

2005 SIIA //CODiE// FINALIST

2005: Best Digital Rights Management Solution: Software

2006 SIIA //CODiE// FINALIST

2006: Best Security Software

WIBU SYSTEMS

WIBU-SYSTEMS USA Inc.
2429 NW 197th Street
Shoreline, WA 98177, USA
www.wibu.com
Tel: 1-206-546-4891
Fax: 1-206-237-2644

Unfortunately, the OS X version of tail is missing a critical feature: following multiple files at once (you can, however, simply tail the last line of multiple files). Every other version of tail I've ever worked with could do this: Solaris, GNU/Linux and yes, even FreeBSD 6. Fortunately, if you're a fink or Mac Ports user (neé Darwin Ports), you can install the excellent `multitail`. `multitail` makes up for the lack of features in the current `tail`. `multitail` has some other nice features, too. I do find the syntax a little cumbersome, though. After you've run '`fink install multitail`' or '`port install multitail`', go check it out with:

```
multitail -I /var/log/system.log -I /var/log/mail.log
```

Very, very handy.

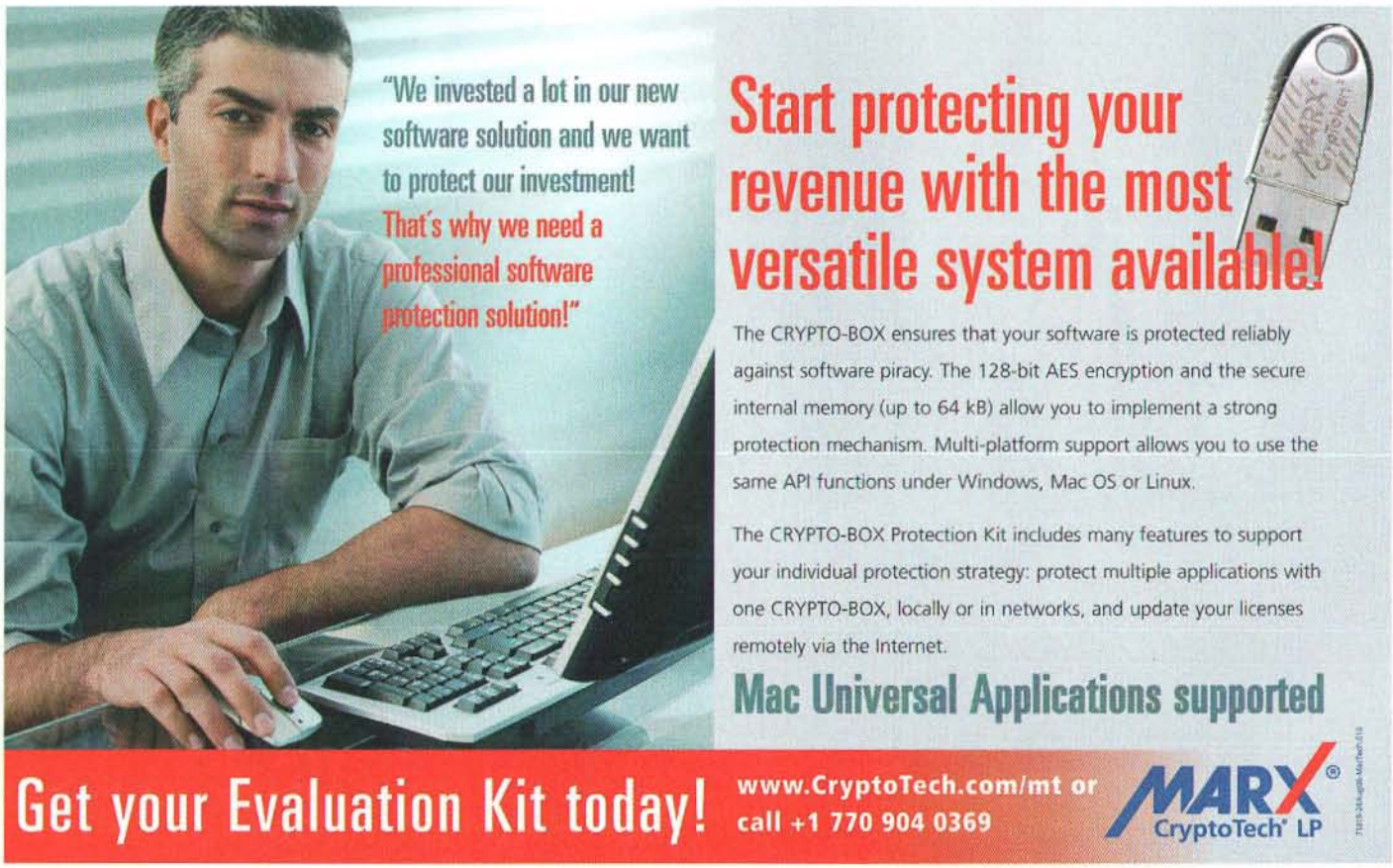
Another program that's great for viewing log files is `less`. Now, most people think of less as a better `more`, or vi-without-the-editing. Did you know that `less` can also follow a file? One thing that I love about using `less` to follow a file is highlighting. Let's say you're troubleshooting an e-mail issue for one user. On a busy server, the mail log fills up and scrolls away pretty quickly. Here's what you do: Run `less /var/log/mail.log`. This just brings mail.log into the buffer of less. Search on the user's login id. For example, you'd type `/stevej` (that's forward slash, then "stevej"). `less` will then jump to the first occurrence of "stevej" and highlight it. Something like this line:

```
Nov 6 05:16:45 xtc postfix/smtpd[4817]: 59D955B7E49:
client=topgun.apple.com[12.34.56.234], sasl_method=CRAM-MD5,
sasl_username=stevej
```

Now, type F (that's a capital F). less will tell you that it is "Waiting for data... (interrupt to abort)" and start following the file, displaying new lines as they're added to it. Interrupt is control-c. As new lines are added, any occurrences of "stevej" will also be highlighted. This can be of tremendous use in spotting a line you're looking for. If you do see something useful scroll by, just hit command-c, and then use the arrow keys or control-b (back one page), and control-f (forward one page) to navigate. When you're ready to follow again, just press shift-F.

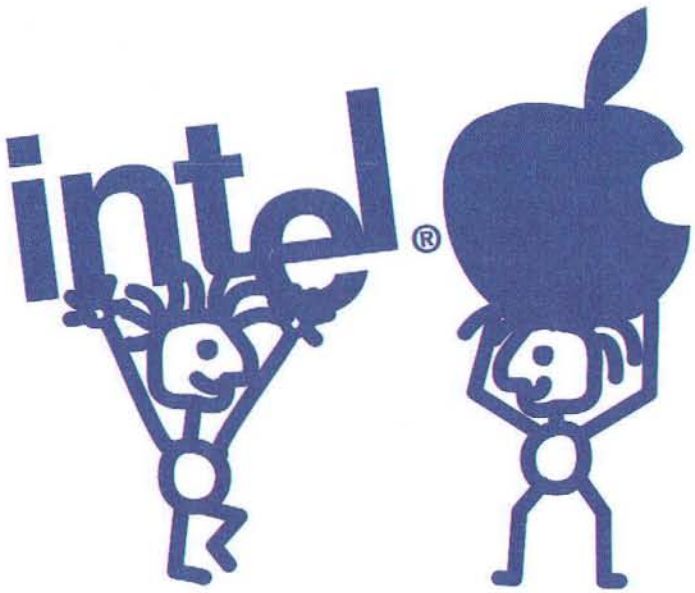
The last way that I'm going to describe is an Apple-specific method. As I mentioned, syslogd in OS X is actually an Apple creation more properly called asl, the Apple System Log. In all other syslogd implementations you find, a message comes into syslogd, gets processed and ultimately written to the right file – end of story. asl does this, too, but then takes the extra step of writing all entries to a backing store. In this case, /var/log/asl.log, but this may change in future releases. This new syslogd-is-really-asl setup appeared in 10.4, so, don't go trying this on your Panther box.

That explanation is leading me to this: the `syslog` program. Note the lack of a trailing 'd', and the fact that you'll only find this on OS X machines. OK, try it: type `syslog` and press return. You'll get a screen full of log entries that looks like you just typed `cat /var/log/system.log`. So, what's the



Moving to Intel®?

We can deliver.



Mac Universal

Our technical expertise spans the entire spectrum of software development, including Mac and Windows applications, system-level programming, cross-platform design, handheld and wireless platforms, gaming, web development, and everything in between. We offer comprehensive development services including project management, software design, implementation, and quality assurance. Our work includes commercial projects for worldwide external release, applications for vertical markets, and custom intra-company enterprise software applications. Check us out at www.criticalpath.com | info@criticalpath.com

Critical Path Software

© 2006 Critical Path Software Inc. All trademarks are the property of their respective owners.

point? The `syslog` program can follow the entries, similar to `less`. The "-w" switch will wait for new data, and display it as it arrives. It'd be nice if, like tail, we saw a few previous entries as well, but syslog stoically sits there, cursor on the line below. OK, I can do this with `less`, what else?

Remember that backing store? Entries are actually written in there in a raw, key/value pair listing. To see that format, we override the default 'standard' format using the '-F' (capital F) switch. Try typing `syslog -F raw`. Looks a little different this time, doesn't it? You can also use the '-F' switch to define a custom format for your purposes – no `awk` required! Try this:

```
syslog -F '$Time $(Sender)[$(PID)]: $Message'
```

This basically just drops the hostname from the standard format. Useful, if the log you're viewing could only be from one host, and you want to focus on the other details.

While not quite as good as `multitail`, by default, `syslog` reports on anything, arriving via the syslog mechanism. This is very useful in conjuction with the `-w` switch. Of course, unlike `multitail`, you cannot choose to watch arbitrary files.

Overall, Apple's asl implementation gets more interesting the deeper you dive into it. It can filter the outout according to your criteria:

```
syslog -k Sender postfix
```

...to see only messages generated by postfix. It also has a full POSIX API, allowing apps to log to and search the asl data store.

All of that said, I rarely, if ever, use syslog to watch logs. Give me the flexibility and portability of `tail`, `grep` and `less` – that's pretty much all you need. Add to it the simple unfamiliarity, newness and slight clumsiness of `syslog`, well...perhaps we'll see more in 10.5.

What Now?

What about all of those other logs I pointed out earlier. Take a look in /Library/Logs. You should see something similar to the following:

```
drwxrwxr-x  3 root  admin  102 Apr 28  2005 AppleFileService
drwxrwxr-x 13 root  admin  442 Jul 17 10:02 Console
drwxrwxr-x  9 root  admin  306 Nov  5 08:07 CrashReporter
drwxrwxr-x 14 root  admin  476 Nov  8 17:19 DirectoryService
drwxr-xr-x  3 root  admin  102 Sep  7 15:48 NetUpdate
drwxrwxr-x  6 root  admin  204 Oct 19  2005 Qmaster
-rw-rw-rw-  1 root  admin 6653 Nov  2 15:04 Software
Update.log
-rw-r--r--  1 root  admin 6910 Oct 19 10:21 panic.log
```

(If you also have a memberd_dump.log, it's because you, or someone on your machine, ran `memberd -1` at some point). All of these entries should look relatively familiar. The thing to note is that many are directories, each containing multiple, though related, log files. These files are ideal candidates to view via `tail` or `less`.

When you start going through these logs, you'll find that some logs are more useful than others. Sometimes, but not always, you can make a seemingly not-useful log very useful! How?

Some programs let you set the level of logging verbosity. Here's where people unfamiliar with Unix are going to say, "see! That's why I hate Unix!" The fact of the matter is, a) it's up to the application, how much or how little it will log, and if it will let you alter that amount, and b) each app handles this in its own way. There is no single mechanism that allows you to alter the logging level for any given app.

If you're using OS X Server, Server Admin will let you alter the log level of most services. Key here being most. If you're using plain 'ol OS X, you have to do it yourself. Doing it by hand can be better in either case as many programs have logging options that Server Admin won't let you set anyway.

Samba is a great example of many of the topics that we've discussed so far: it can log via syslog, its own mechanism or both. Additionally, you can configure the detail of the logs from minimal to very detailed. You can get more information right on your own disk at file:///usr/share/swat/using_samba/ch06.html, but here's the gist: In samba's /etc/smb.conf file, the following entries configure logging:

log level: sets the detail of the log. Ranges from 1(minimal) to 10 (extreme!).

log file: Where to store the logs file on disk.

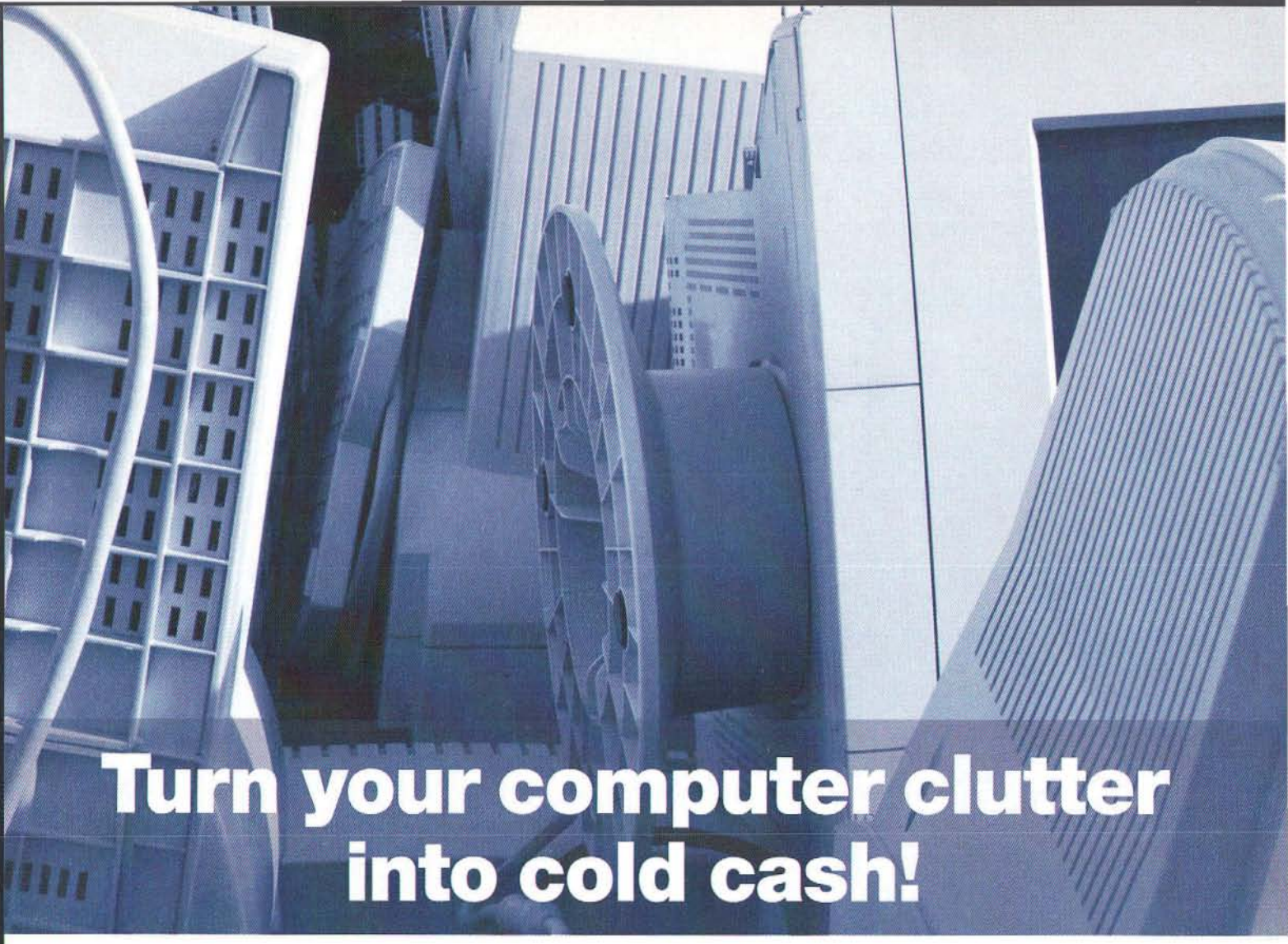
max log size: Max size in Kb before samba rolls the log.

debug timestamp: Show time stamps in the logs? Values of "yes" or "no".

syslog: Send log entries to syslog? Value is a number that represents the syslog level – values of or below the number you specify are sent to syslog. Anything higher is only sent to the samba logs.

syslog only: says what it does, does what it says. Set to "yes", you won't see any entries in the samba logs.

By default with OS X, samba does not log through syslog. This is the primary reason I stick with `tail`, `grep`, and `less` as my log analysis tools of choice. Samba also does something pretty cool with its config file: while most programs require a reload to pick up alterations, changes in /etc/smb.conf file are picked up every 60 seconds – no reload required! (This can be dangerous too – always work on a copy of smb.conf, check it with testparm, keep the good one on hand just in case, and then move the copy into place.)



Turn your computer clutter into cold cash!

WE BUY Apple Macintosh and other brand name laptops, desktops and servers. We buy from businesses, institutions and individuals. One unit or a thousand, working or not, contact us for a quote. **AND...**

WE SELL fully refurbished Apple Macintosh computers and other brand name laptops, desktops and servers. We provide you a new computer experience, at a used computer price.

Call us today

(800) 960-1140

SEE US AT MACWORLD EXPO MOSCONE CENTER BOOTH #208

MicroReplay

www.microreplay.com

MicroReplay, Inc. 309 Walnut Street, Wellesley, MA 02481 - (781) 237-1140

Does

+

= questions?

Are you routinely looking for answers?

Imagine a whole year of answers.

MacTech Magazine is already read every month by tens of thousands of readers. Readers that represent the very heart and soul of the Mac community. Join the crowd and sign up today!

For a special one year subscription, visit:
store.mactech.com

MACTECH

Toll Free 877-MACTECH, Outside US/Canada: 805-494-9797

My other favorite non-system.log log is the debug log generated by DirectoryServices (although DirectoryServices does log via asl). I mentioned this in the August 2006 Mac in the Shell column, but it bears repeating. Find Directory Service's logs at /Library/Logs/DirectoryService. To increase the verbosity, send the DirectoryService process a USR1 signal: `killall -USR1 DirectoryService`. Now have a gander at your /Library/Logs/DirectoryService/DirectoryService.server.log file (or, use syslog -k Sender DirectoryService – perhaps even with the -w flag).

Conclusion

Understanding how to read and monitor log files can make troubleshooting easier. More importantly, it is a harbinger of issues, before your users complain. For something that's just baked into me at this point, I tend to take logs for granted (just a little). Even I didn't realize that this topic was so deep and that I'd write this much. Hopefully, the importance of logs, and ways you can make your life easier with them is much more clear now. There are even a few things I just couldn't touch on this month regarding logs, as they really deserve more attention. So, next month (to my surprise), I'll be discussing my favorite log monitoring utilities. You can't stare a monitor watching logs 24x7, right? But, a computer can.

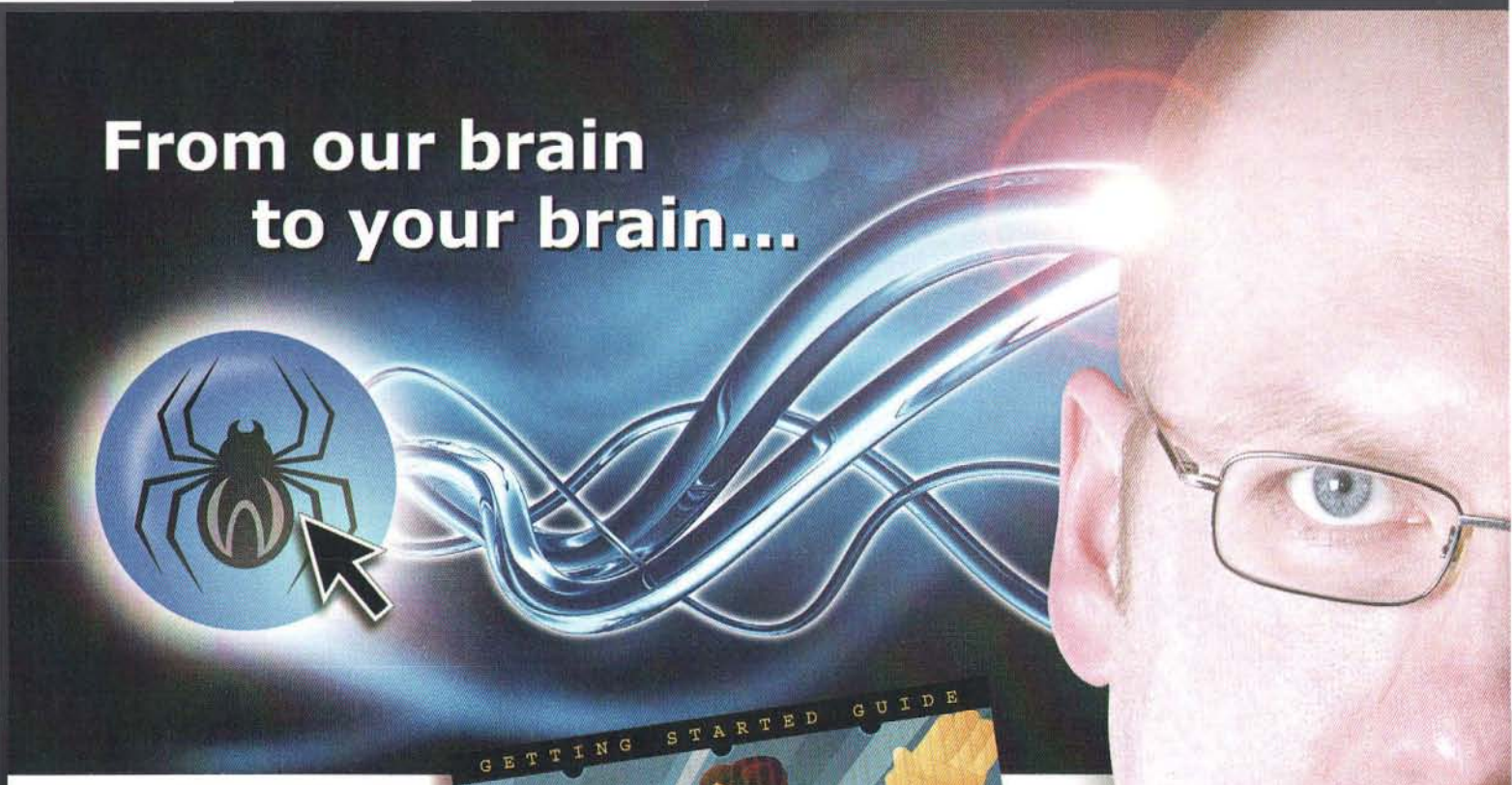
Media of the month: Neal Stephenson's Cryptonomicon. An 'oldie' (1999) but goodie. Now that it comes in paperback, it's even that much easier to read! Despite the Neal Stephenson book-ending-curse, Cryptonomicon is a great read, incredibly prescient; you'll recognize many of the elements, and ultimately learn something (especially if you continue on to the Bruce Schneier penned appendix!).

January! Happy New Year, and Happy MacWorld! If you're attending the show, please stop by the MacTech booth! If you picked this issue up while at the booth, stop back often and please say hello to the MacTech staff and authors that will be doing the same.

About The Author

Ed Marczak owns and operates Radiotope, a technology consultancy that brings enterprise solutions to small and medium-sized businesses. Outside of this piece of the puzzle, he is Executive Editor of MacTech Magazine, a husband and father, and CTO of WheresSpot, among other things. Find the missing tech piece at <http://www.radiotope.com>.

From our brain to your brain...



NEW!

SpiderWorks Books

Timely, quality content from respected authors at a great price. Available in softcover print editions and eBooks.

Download FREE Previews at SpiderWorks.com

Jumbo Frame Networks

Tap into extra Ethernet Speed

By Steve Modica

Approximately one year ago, Apple introduced its first dual Ethernet G5 PowerMac. The system sported an internal Broadcom chip that provided the user with two high-speed Gigabit Ethernet ports.

Why would Apple include a second Ethernet port on their new PowerMac systems? One reason (probably the most obvious) is for Xsan support. To add a system to an Xsan storage network (or almost any clustered filesystem network), the system must be connected to the Fibre Channel based storage, its normal internet connection, and a dedicated "Meta-data" network.

On the previous generation of PowerMacs, this would require the customer to purchase an extra Gigabit Ethernet NIC (network interface card), which uses up one PCIX or PCIE slot and requires the user to open up the machine to install the device. When you consider the extra Fibre Channel card (which may have been ordered directly from Apple), you're now down to one free PCI slot to house your high-speed video capture or other application specific devices.

Given the minimal price premium for going to a dual port Gigabit Chip from a single port, adding that second connector was a no-brainer for Apple.

Xsan and clustered filesystems in general, have a lot of promise. Systems can be attached directly to the shared storage using Fibre Channel, and the Ethernet based "meta-data" network is used as the traffic cop. It assures that multiple systems aren't modifying the same filesystem structures simultaneously.

The problem with these new filesystem technologies is the entry point cost. Purchasing an Apple XRAID is quite economical given their cost per byte ratio (one of the lowest in the industry), but when you add in the cost of a Fibre Channel switch, Fibre Channel adapters for each machine, additional Ethernet ports for the meta-data network and the software licenses, the cost begins to approach $30,000 for even the smallest network. When compared to even high-end NAS storage devices, the choice is easy.

So assuming you are one of the many 5-10 system shops that simply can't justify a $30,000 entry point for storage, but you've paid for all of these great PowerMac and Mac Pro systems with second Gigabit Ethernet ports, what can you do to take advantage of them? There's nothing worse than buying something and leaving it sit idle, especially when shared network performance is one of the most common complaints at small shops.

One very common use of these extra ports is to create a dedicated storage network that uses Gigabit Ethernet's built-in "jumbo frame" technology to speed up the transfer of data, while reducing the amount of cpu overhead created when transferring that data.

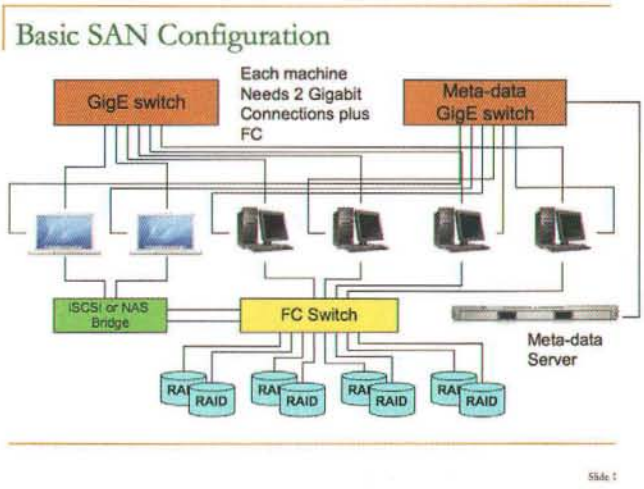


Figure 1.

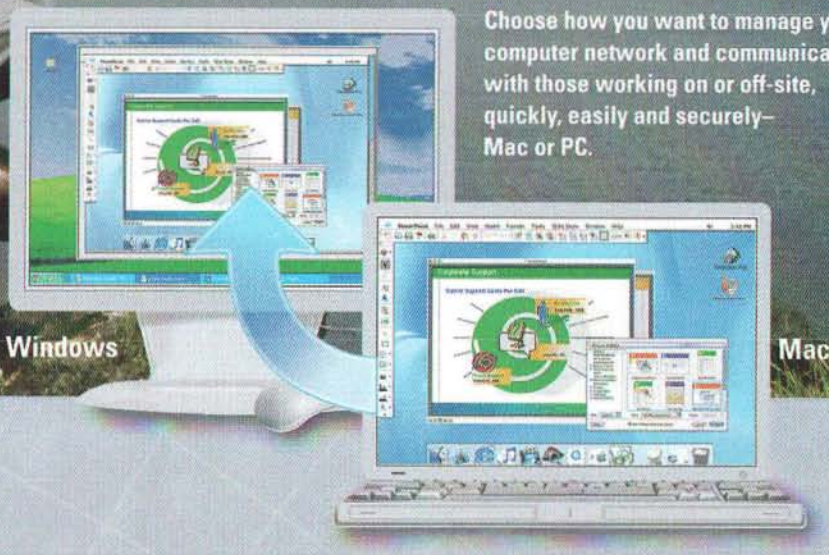
A configuration like this can significantly improve network performance for file-transfers, captures and downloads, while freeing the "normal" office network for things like email, web browsing and DHCP services. This setup will also increase the amount of CPU cycles available on the server and the clients for local image processing — a big win for everyone in the office.

What are Jumbo Frames? Seven years ago, when Gigabit Ethernet was just becoming available, processors were a lot

Stay in Control

wherever you go

with Timbuktu® Pro and Skype™, you can!



Choose how you want to manage your computer network and communicate with those working on or off-site, quickly, easily and securely– Mac or PC.

Timbuktu Pro version 8.6

- Skype Internet telephony integration
- Universal binary support for Macintosh

For IT professionals, telecommuters and those on the go, Timbuktu Pro is the award-winning standard in remote control technology for access to remote Windows and Macintosh desktops on LANs, WANs, the Internet, or through Skype telephony connections. For nearly 20 years, Timbuktu Pro has made it simple to find, connect, and control remote client machines from anywhere!

Download a free evaluation at:
www.timbuktupro.com

Mac Universal

netopia® | BROADBAND WITHOUT BOUNDARIES®

Timbuktu Pro 8.6 works with Skype software. This product uses the Skype API but is not endorsed or certified by Skype. Skype is a trademark of Skype Technologies S.A. in Luxembourg and other countries.

© 2006, Netopia, Inc. All rights reserved. Netopia, the Netopia design, and Timbuktu are registered trademarks belonging to Netopia, Inc., registered in the U.S. Patent and Trademark Office. All other trademarks are the property of their respective owners.

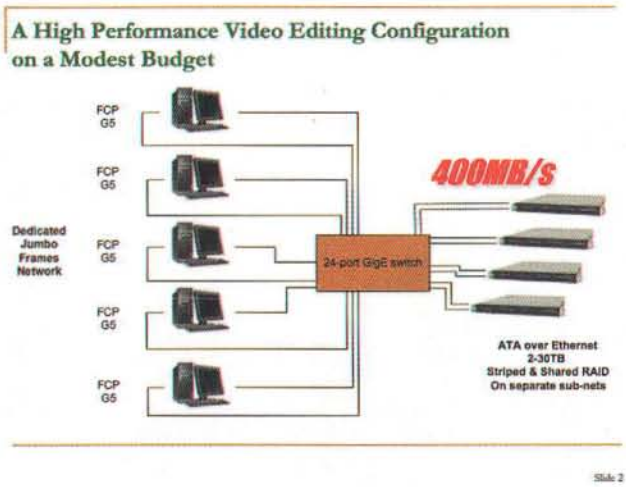


Figure 2.

slower than they are today. Vendors weren't crowing about how many Ghz their systems were clocked at. They were still working on hitting the 1Ghz mark! These new "high-speed" Gigabit adapters were expensive and quirky. Finding adapters (which typically ran $1500 or more) that worked with all your platforms and a switch that worked with all your adapters was no small task.

During this period, a typical Gigabit Ethernet adapter would easily eat up an entire CPU just for interrupt processing. It was rare to see a Gigabit adapter perform at "line rate" (IE 1 Gb). More typically, adapters would get between 400 and 600Mbits/sec. This is still plenty good, but it must be remembered that while maintaining these rates, your machine wasn't doing anything else.

Enter the notion of "Jumbo Frames"

Ethernet (and all of its add-on features) are defined as IEEE 802.3. This spec includes things like auto-negotiation, link aggregation, 10MbEthernet, 100Mb/Ethernet and even 10Gb/Ethernet. The spec defines the size of an Ethernet frame as 1500 bytes – typically somewhere between 1488 and 1514 bytes depending on the platform.

Receiving 1 billion bits of data adds up to 83,333 packets per second. Theoretically, each one of these packets requires the CPU to stop what its doing, receive the packet from the Gigabit card, process the headers, and provide the data to the waiting application (you).

At 83,333 packets per second, most of the CPUs time is spent context switching. It's constantly saving and recalling what it was doing just prior to processing your last packet. No real work is getting done.

Vendors quickly realized that unless they wanted to wait for processor and bus speeds to catch up, they wouldn't sell many cards. They needed a solution that would allow their

products to work on the slower processors available at that time. Jumbo frames provided one such solution.

Rather than moving data in 1500 byte chunks, they allowed their cards to use much larger packets. Some vendors supported 16384 bytes, others supported smaller numbers. The "de facto" standard was 9000 bytes.

At 9000 bytes per frame, the packet processing load is reduced by a factor of 6 (13,888 packets per second). The CPU has 1/6th the number of headers to process and theoretically, $1/6^{th}$ the number of interrupts to handle.

Today, all but the very cheapest switches support jumbo frames and switch ports for Gigabit are well under $100 per port. This makes it extremely easy and economical to create a dedicated jumbo frame network.

Benefits

1. Having a separate network means less bandwidth contention for critical operations like captures or online editing.
2. Jumbo frames allow local systems to have more CPU cycles available for things like Final Cut Pro, improving the users experience running the application.
3. A jumbo frame network can support a larger class of systems including Apple Macbook, Macbook Pros, Mac Minis and iMacs.
4. Jumbo frames can be used to access "storage over Ethernet" devices like iSCSI and AoE RAIDS, such as those designed by companies like 2 Degrees Frost. These products eliminate typical bottlenecks found in client/server networks.

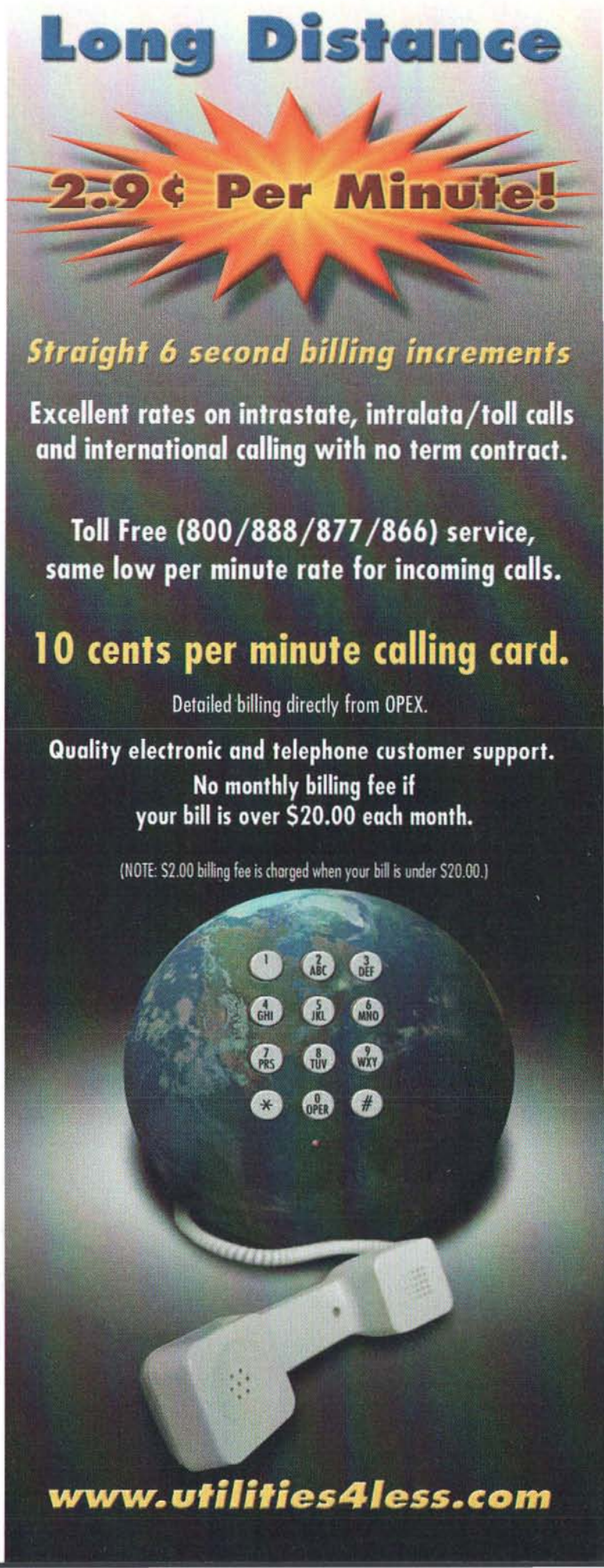
Conclusion

Having extra Gigabit ports on your machines makes using jumbo frames easier than ever and the benefits are tremendous. All small video capture and post houses, audio and pre-press shops should consider this simple, elegant solution to improve their network without breaking the bank.

MT

About The Author

Steve Modica is the Chief Technical Officer of Small Tree Communications. Mr. Modica brings over 15 years of experience in the field of high performance operating systems to the company. Prior to founding STC, he worked at Silicon Graphics Inc. managing a group of device driver engineers and managing third party vendor relationships. For the four years prior to joining SGI, he owned and operated HPC Consulting; a company specialized in customizing corporate networks. Mr. Modica attended Wayne State University in Detroit on a Merit Scholarship and received his degree in Electrical Engineering in 1992.



Laptop Hard Drive Speed

4200, 5400, 7200 RPMs ... does it really matter?

MACTECH LABS

By Neil Ticktin

RPMs: Are They Important?

It used to be that pretty much the only choices you had on laptop hard drives were size. But nowadays, there are a number of size choices (with larger sizes going from 100 to now 200GB), a couple of interface choices (PATA vs. SATA), and a few speed choices (4200, 5400 and 7200 RPM). As most 2.5 inch drive purchasers will tell you, there's a trade off between speed and size. You can't get the largest drives in the fastest speed ... in fact, they are almost inversely proportional.

For most laptop drive purchasers, the question becomes "how important are RPMs?" and "will I notice a difference?" With those questions in mind, we set out to do some real world testing, and see what we could find out.

Hitachi's Offerings

For the test, we used an older PowerBook G4 running at 1.67GHz. We used the G4 to make the differences more apparent, but in general use, we found the G4's results to hold proportional and consistent with all Mac laptops, including the Core Duo and Core 2 Duo machines. Some overview information on these Hitachi drives – skip to the next section if you are just interested in the test results.

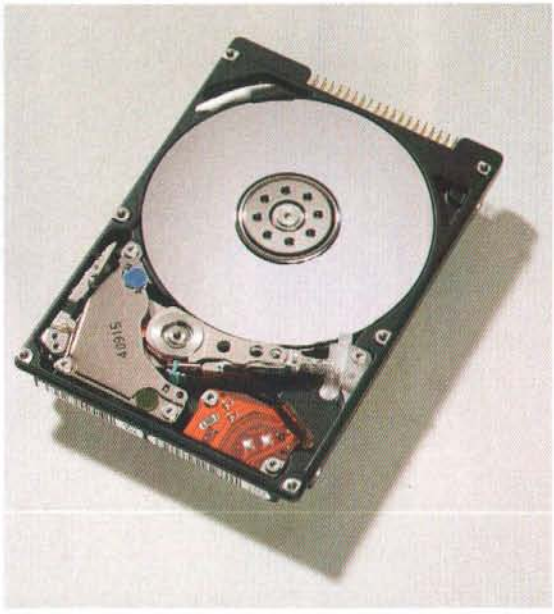


Figure 1. Hitachi Travelstar Drive

Travelstar 7K100 and Travelstar 5K100 are part of Hitachi's range of 2.5-inch hard drives. These drives are available with either the Parallel ("old-school") ATA (ATA-6), or Serial ATA interface. Native SATA implementation offers

Get the answers from those in the know!

MACTECH®

Special Bundle Pricing!

Only $59.95!*

The MacTech CD and a
One year Magazine Subscription
Over a $97 saving
off regular pricing!

Now in our
23rd year!

The bundle is a terrific value: Have over 2800 articles from 800 industry experts at your fingertips with the CD and keep up to date with your monthly magazine subscription!

Order today at www.mactech.com/deals/macdirectory
Toll free: 877-MACTECH fax: 805-494-9798
International: 805-494-9797
email: info@mactech.com

(*) International delivery is only US$109.95, Canadian delivery for just US$71.95.

throughput at 1.5 Gbits/sec, and supports Native Command Queuing (NCQ), Hot Plug, Staggered Spin-up, Link Power Management, and other SATA extension features to meet the design requirements of single drive systems, as well as multiple drive architectures. (Yes, we realize that the 'hot-plug' feature is of little use for an internal laptop drive…) The optimized Femto-based actuator/suspension system of the Travelstar 7K100 and Travelstar 5K100 allows them to withstand 300 and 1,000 Gs of operating and non-operating shock, and to last for 600,000 load/unload cycles.

The Travelstar 7K100, a series of 7200 RPM 2.5-inch hard disk drives, is available in capacities of 60, 80, and 100 GB with 3, 4, and 4 data heads respectively and 2 data disks each. The maximum areal densities of 60, 80, and 100 GB hard drives are 66, 66, and 81 Gbits/sq. inch respectively. The sector size in 7K100 series of 2.5 inch hard drives is 512 bytes with 24 recording zones. Data buffers of the 7K100 series is 8 MB with latency average of 4.2 ms. Average seek time is 10 ms for a read cycle, and 11 ms for a write cycle. Track to track seek time is 1 and 1.2 ms for a read and write cycle, respectively. Full stroke seek time is 18ms for a read cycle, and 19 ms for a write cycle. The Travelstar 7K100 has a media transfer rate of up to 625 MB/sec, and power consumption of 0.85 W in low power idle mode. Power requirements of the 7K100 series are +5VDC (+-5 %) with power consumption of 5.5, 2.3, 2, 2, 1.1, 0.2, and 0.1 W in startup, seek, read, write, active idle, standby, and sleep modes respectively. The operating and non-operating temperature ranges of 7K100 series are 5 to 55 degrees C and minus 40 to 65 degrees C respectively. Dimensions of 7K100 series hard drive are 9.5 mm height x 70 mm width x 100 mm depth. Hard drives in the 7K100 series are 115 grams in weight.

The Travelstar 5K100 is a series of 5400 RPM 2.5-inch hard disk drives, available in capacities of 40 to 160 GB with 2, 3, 4, and 4 data heads and 1, 2, 2, and 2 data disks respectively. The maximum areal densities of 40, 60, 80, and 100 GB hard drives are 70, 70, 70, and 86 Gbits/sq. inch respectively. The sector size in 5K100 series of 2.5- inch hard drives is 512 bytes, with 16 recording zones. Data buffers of the 7K100 series are 8 MB with latency average of 5.5 ms. Typical average seek time is 12 ms. Travelstar 5K100 has a media transfer rate of up to 493 MB/sec, and power consumption of 0.60 W in low power idle mode. Power requirement of 5K100 series is +5VDC (+-5 %), with power consumption of 5, 2, 2, 0.85, 0.2, and 0.1 W in startup, read, write, active idle, standby, and sleep modes respectively. The operating and non-operating temperature ranges of 5K100 series are 5 to 55 degrees C and minus 40 to 65 degrees C respectively. Dimensions of 5K100 series hard drive are 9.5 mm height x 70 mm width x 100 mm depth. Hard drives in the 5K100 series are 95 and 102 grams in weight.

Both series of drives feature Enhanced ABLE (Enhanced Adaptive Battery Life Extender), a power-management technology that dynamically selects the appropriate mode to

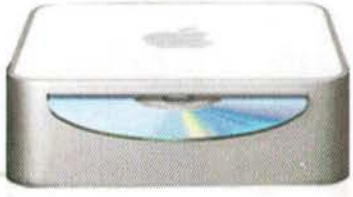
Reliability Security Flexibility

Run what ever you want
Web servers, mail servers, DNS servers, backup your office, 4D, mySQL, Lasso, Filemaker, Asterik PBX's. You name it.

Signup now and save
In addition to our basic services we offer remote reboot of power, a hot standby machine in the event of failure, advanced statistics DNS services and more.

Proven reliablity
With hundreds of minis in our facility, multiple internet connections, battery backup and diesel generators: We just don't go down.

Mac mini **Colocation**
Big Value Offers!

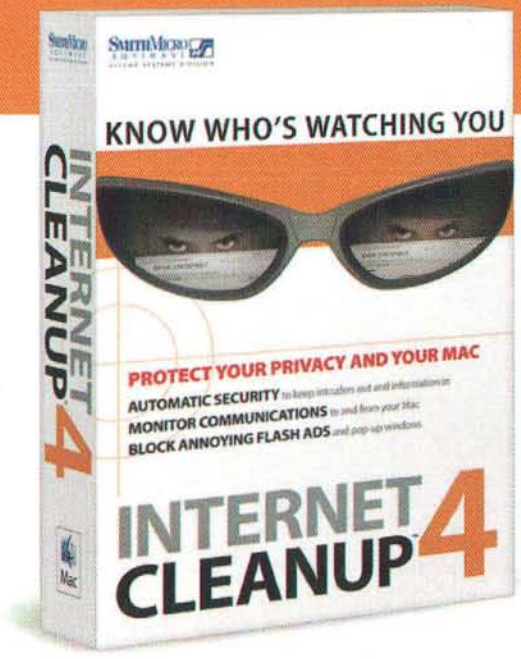


Your own mini in our data center
Starting at $34.99

www.macminicolo.net

macminicolo.net and macminicolo.net logo are the trademarks of macminicolo.net
All other brand product name are trademarks or registered trademarks of their respective brands.

KNOW WHO'S WATCHING YOU.



INTERNET CLEANUP 4

Protect your privacy and your Mac!

Stop programs from silently connecting to the Internet.
Erase your browser history and instant messenger logs.
Search and filter your email attachments.
Prevent others from invading your files.
Permanently shred your private files.
Block pop-ups and Flash ads.

Mac | Universal

Fight back and safeguard your Mac.
DOWNLOAD YOUR FREE TRIAL TODAY!
www.allume.com/mac/cleanup/

SMITHMICRO SOFTWARE
ALLUME SYSTEMS DIVISION
WWW.ALLUME.COM

® TM, and © 2006 Allume Systems, Inc. Mac OS X 10.4 "Tiger" or better is required.

minimize power usage, and help preserve battery life, when the disk drive is idle. Both series of 2.5-inch hard drives come equipped with Enhanced Error Correction Code for ensuring data integrity, and Fluid Dynamic Bearing (FDB) motor for quiet operation. These hard drives also feature TrueTrack, which is a suite of advance servo technologies that enable hard drives to maintain true tracking accuracy of the heads despite disk shift from shock or vibration. The drives are also RoHS compliant. Typical suitable applications for Travelstar 7K100 and Travelstar 5K100 include, notebook and tablet PCs, gaming devices, compact desktop systems, graphics and CAD workstations, external storage solutions, and video editing and surveillance.

These drives range from about $50-60 up to $200-250, depending on the model and size. For more information visit: http://www.hitachigst.com

The Tests

There were two classes of tests that we ran — shorter and longer ones. The longer tests included the time it took for booting to start after powering up, boot time, fixing permissions, a complex search in Eudora email, import into FileMaker, and having Safari open up many windows. The shorter tests included a file copy, launching Dashboard, launching Eudora, Safari and Word. In short, all the tests were not based around specs, but around real world operations. The system was identical on both, as were the contents of the drives.

The Results

Numerically, there was a noticeable difference: the 7200 RPM drive was 25-40% faster. The charts give you more detailed information.

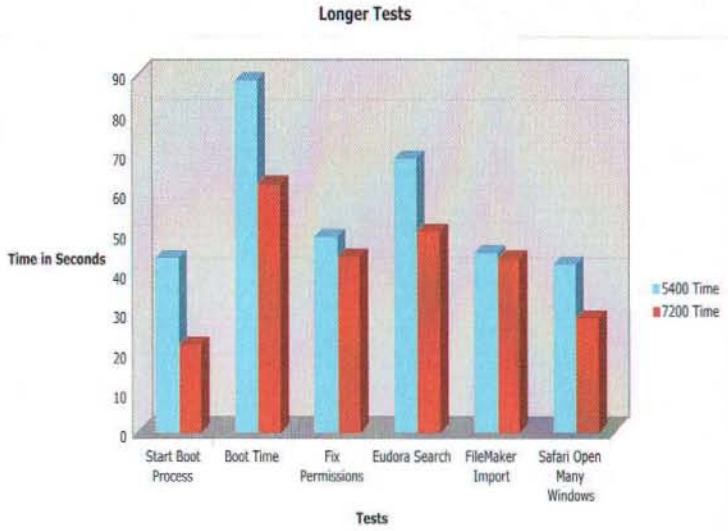
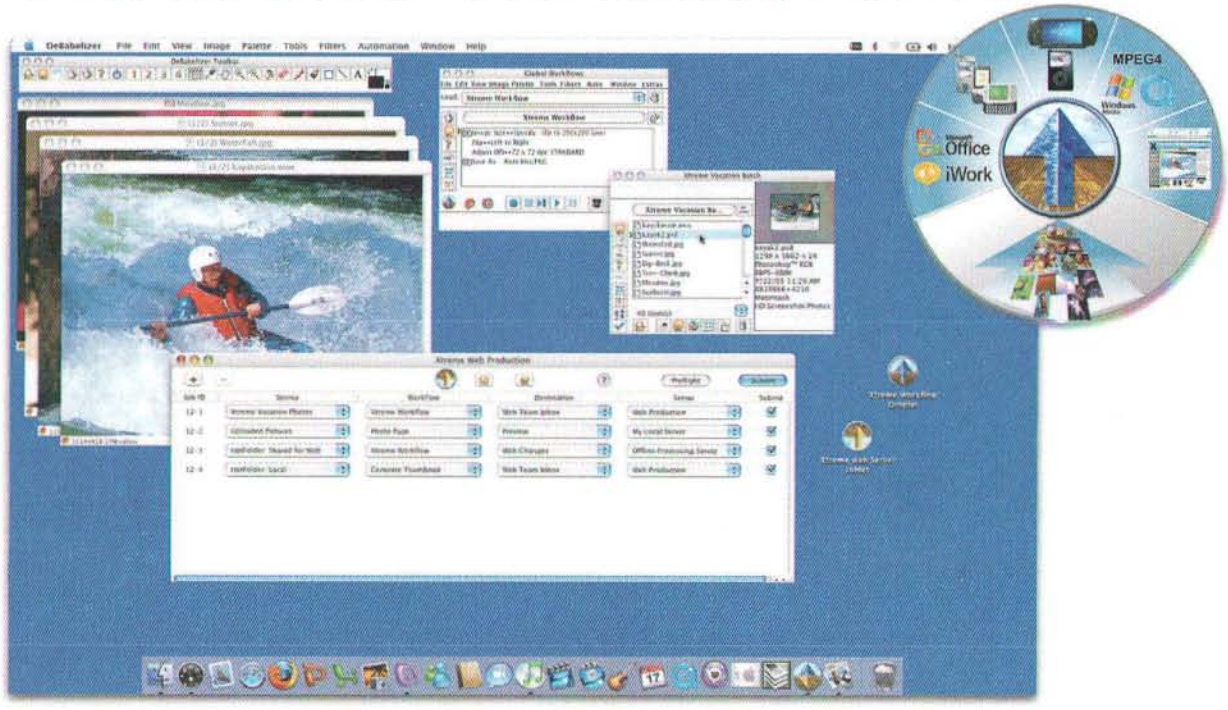
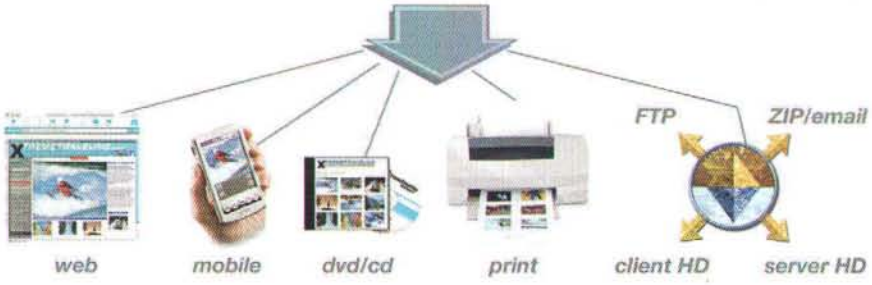


Figure 2. Longer Tests, 5400 vs. 7200 RPM

Complex end-to end workflows are as easy as a drag-n-drop with the new Debabelizer® Pro Client/Server.



Now you can automate hundreds of repetitive media editing, optimization, conversion and delivery actions on the desktop and server with a simple drag and droplet.



Introducing the next generation in media automation—the new "action packed" Equilibrium® DeBabelizer® Pro 6 Client & DeBabelizer Server for Mac® OS X/OS X Server.

Deliver high-quality, high-speed results, while saving you time and money in the process. Automatically prepare your images, animations and digital video files on your desktop for optimal multi-channel delivery with the new Equilibrium DeBabelizer Pro 6. When you purchase the new DeBabelizer Server (free trial included), you and your team can send numerous media processing jobs to the server level for lightning fast results delivered to any off-line location, FTP site, and back to you, or Zip and email to anyone on demand. Whether you're designing content for websites, mobile devices, DVDs, video games, interactive applications and print, Equilibrium DeBabelizer Pro 6 and DeBabelizer Server delivers.

Call 866.EQUILIB or visit www.equilibrium.com/upgrade now to DeBabelizer Pro 6 for only $149.95*

Watch our demonstration video: www.equilibrium.com/video/

equilibrium®
Automated Media Processing Solutions

Includes 50 free DeBabelizer Pro 6 Automator Actions for "Tiger" and create your own with a single click!

Mac

*For a limited time only.

© 2006 Automated Media Processing Solutions, Inc. DBA Equilibrium. All rights reserved. U.S. Pat. No. 6,757,575 for automated media processing and delivery. Other patents pending. DeBabelizer is a registered trademark of Equilibrium. Mac and the Mac logo are trademarks of Apple Computer, Inc., registered in the U.S. and other countries.

As a user, what's more important is how it feels. And, there was no doubt about it … the 7200 RPM felt considerably snappier and more responsive than the 5400 RPM drive, and while not included in the test, the 4200 RPM drive would have shown an even bigger difference.

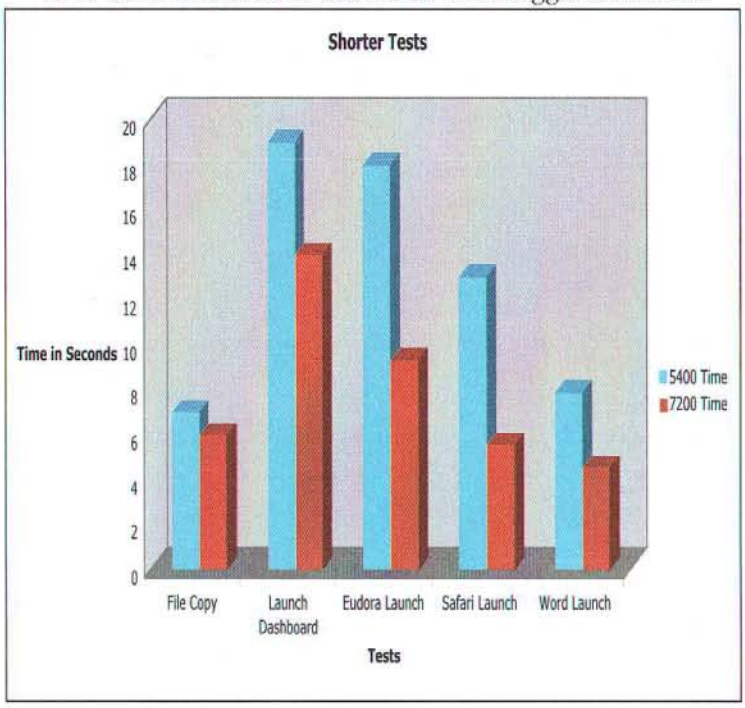


Figure 3. Shorter Tests, 5400 vs. 7200 RPM

Conclusion

There's no question in our testing that the faster drives are *noticeably* faster. So, the question for you as you choose your drive is, "what's your priority?" If size is more important than speed, then go with size, but remember that not every operation will be as fast as your machine could make it. If speed is more important, then definitely go for the 7200 RPM drives in the smaller sizes. 5400 RPM drives are really the contemporary bare minimum speed you should settle for.

MT

About The Author

Neil is the Publisher/Editor-in-Chief of MacTech Magazine. Neil has been in the Mac industry since 1985. When Neil writes a review, he likes to put solutions into a real-life scenario and then write about that experience from the user point of view. That said, Neil has a reputation around the office for pushing software to its limits and crashing software/finding bugs.

MACTECH® Magazine
store.mactech.com/riskfree

A BEST-IN-CLASS NETWORK IS WITHIN YOUR BUDGET
Cisco® • Juniper® • Extreme®

Does a tight budget compromise your network quality, functionality and reliability? With guaranteed pre-owned networking equipment from Network Hardware Resale, your network runs on top-tier Cisco equipment that performs like new, at a fraction of the cost. Equipment is delivered overnight with your configurations pre-loaded. Unparalleled warranty and support service leave nothing to chance. That's best-in-class.

To learn more, email nhrsales@networkhardware.com or call 805-690-3754.

www.networkhardware.com

Routers • Switches • Security
Access Servers • VoIP • Memory

- **Buy, sell** or **trade** pre-owned equipment
- **One-year, advanced replacement** warranty
- Prices **50% to 90% off** list
- **Overnight** delivery
- Cisco certified **technical support** available
- More than **$100 million in inventory** – **current and past generation** products

NETWORK HARDWARE RESALE
The World's Most Trusted Source™

One-year warranty available to retail customers only. Overnight delivery subject to FedEx service restrictions. Network Hardware Resale and the Network Hardware Resale logo are trademarks of Network Hardware Resale LLC. All other company or product names are property of their respective owners.
© 2006 Network Hardware Resale LLC.

PLEASE HELP!

"I wanna buy this car ASAP!"

Holger Ehlis, CEO, Spymac Network, Inc.

...But don't worry, you give us money just by using Spymac. Like most sites, we generate revenue by showing advertisements to people like you, so we thought it only made sense to send some of that money your way.

Introducing the new Spymac, where we share the money we make from advertising with the people who help us earn it. So grab a camera and film your wacky Friday-night adventures, record your latest guitar solo, or just upload incriminating photos of your neighbor dancing in his underwear.

Whatever you do, just stop giving away your work and creativity for free!

Copyright 2006, Spymac Network, Inc. in New York. Visit www.spymac.com

By Marianne Shilpa Jacobie, and Neil Ticktin

Juniper/Netscreen Protection

Today's big bad world presents its challenges ...

The Dangers

For whatever reason, there's a group of people out there in the world who think it's fun or right to poke around and disrupt networks that are not theirs. As a result, we have more secure networks today that include routers and switches, firewalls, and VPNs (virtual private networks).

One of the biggest brands in the security business is NetScreen, which is part of Juniper Networks. Juniper has a variety of offerings, but we're going to focus on three products: the NetScreen 25, the SA 2000 and the NetScreen 5GT Wireless.

Netscreen 25

The NetScreen 25 (and the 50) are security appliances. These are integrated devices that target the enterprise "branch" office as well as remote offices, and small to medium-sized businesses. The idea is that this box protects the perimeter of your network from unwanted activities.

The NetScreen-25 offers 100Mbps of firewall and 20 Mbps of VPN performance. It can support 32,000 concurrent sessions, and 125 VPN tunnels. The NetScreen-50 offers even greater capacity: 170 Mbps of firewall and 45 Mbps of 3DES or AES VPN performance, with support for 64,000 concurrent sessions, and 500 VPN tunnels.

NetScreen-25

The most important feature to the NetScreen-25/50 is that you plug it in, and it works. With little configuration, this box will immediately start protecting your network with various deep inspection firewall services, denial of service protection, and more.

This is a very capable box, and we watched it prove it's worth in stopping attacks cold that came from all over the world. It's amazing how many times networks get attacked, and the NetScreen-25 just deals with it ... cleanly and transparently.

Finally, take your pick of interfaces to match your managing style: Web UI, CLI, or NetScreen's Security Manager central management system application.

At $2,500 and up, street price, you'll more than make up for this in time on your first attack, or in creating VPNs. See

Connect People, Projects, and Workflow.

Introducing...

Workgroups™ 2006

Process and Productivity Management Suite for Creative, Publishing & Prepress

Job Manager 4.0
Financial Productivity Management

Job Manager enables creatives and production workgroups to accurately create estimates and quotes, monitor job costs, quickly generate on-demand reporting and invoices, and share information with accounting systems.

Virtual Ticket 7.0
Project & Workflow Management

With Virtual Ticket you'll bring together all the components of your work in a centralized location, including project briefs, job tickets, customer info, all the associated document files, and more.

Approval Manager 1.0
Collaborative Approval Management

Approval Manager masters the inherent difficulty of managing, tracking, and scheduling any proof approval process within and across creative and production environments.

Digital Storage Manager 2.0
Document Storage Management

Digital Storage Manager is a powerful storage management solution specially designed to manage the thousands of digital document files during the creative and production process.

Meta COMMUNICATIONS

Download FREE Trial Software Today!

www.meta-comm.com · 1 (800) 771-6382

©2006 MetaCommunications. Workgroups, Workgroups 2006, Job Manager, Virtual Ticket, Approval Manager, and Digital Storage Manager are trademarks of MetaCommunications, Inc. All rights reserved. Additional company and product names may be trademarks or registered trademarks of the individual companies are respectfully acknowledged. Software and licensing subject to change without notice.

http://www.juniper.net/products/integrated/ns_2550.html for more information.

Juniper Networks Secure Access 2000

The Secure Access 2000 (SA 2000) SSL VPN was introduced to the Juniper Network Secure Access series in 2005. It utilizes the SSL security protocol, a secure access transport mechanism available in all standard web browsers. This enables small to medium-sized companies to provide controlled remote and extranet access to employees, partners, and clients with no infrastructure changes, DMZ deployments or software agents.

Juniper SA 2000

Apart from lowering the total cost of ownership, this function allows companies to secure access to the corporate intranet, enabling administrators to restrict access to various employees, contractors or visitors, based on the information and resources they need. The SA 2000 is based on industry-standard protocols, therefore its investment can be leveraged across many applications and resources over time. It also boasts extensive directory integration (including LDAP!) and advanced software feature sets such as multiple hostname support and a customizable user interface.

The SA 2000 series provides complete end-to-end layered security, including endpoint client, device, data and server layered security controls. The numerous security options from the end-user device to the application data and servers, also covers coordinated threat control with Juniper Network's IDP product line. Juniper's endpoint defense initiative incorporates native functionality, client and server-side API's (created in partnership with best-of-breed endpoint security vendors), and advanced malware protection capabilities. While this keeps your Mac systems secure, it really shines for those initially difficult-to-secure Windows machines.

With the native functionality, client computers can be checked at the beginning and throughout the session to verify an acceptable security posture requiring or requesting network ports. Files and processes can also be checked, and their authenticity validated with MD5 checksums. The native host checker also performs security and applications checks, and carries out pre-authentication checks and enforcement. Enterprises are also enabled to write their own host check method to customize policy checks. Again, this targets

BMS

THE LAW OFFICE OF
BRADLEY M. SNIDERMAN

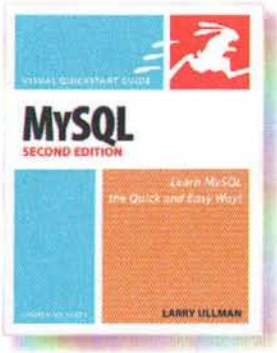
Helping clients with their software legal issues.

- Trademark and Copyright Registration
- Trade Secret Protection
- Licensing and Non Disclosure Agreements
- Assist with Software Audits

I am an attorney practicing in Intellectual Property, Business Entity Formations, Corporate, Commercial and E-commerce Law.

Please give me a call or an e-mail. Reasonable fees.

23679 Calabasas Rd. #558 • Calabasas, CA 91302
PHONE 818-706-0631 FAX 818-706-0651 EMAIL brad@sniderman.com



GET UP AND RUNNING QUICKLY!

For more than 15 years, the practical approach to the best-selling *Visual QuickStart Guide* series from Peachpit Press has helped millions of readers—from developers to designers to systems administrators and more—get up to speed on all sorts of computer programs. Now with select titles in full color, *Visual QuickStart Guide* books provide an even easier and more enjoyable way for readers to learn about new technology through task-based instruction, friendly prose, and visual explanations.

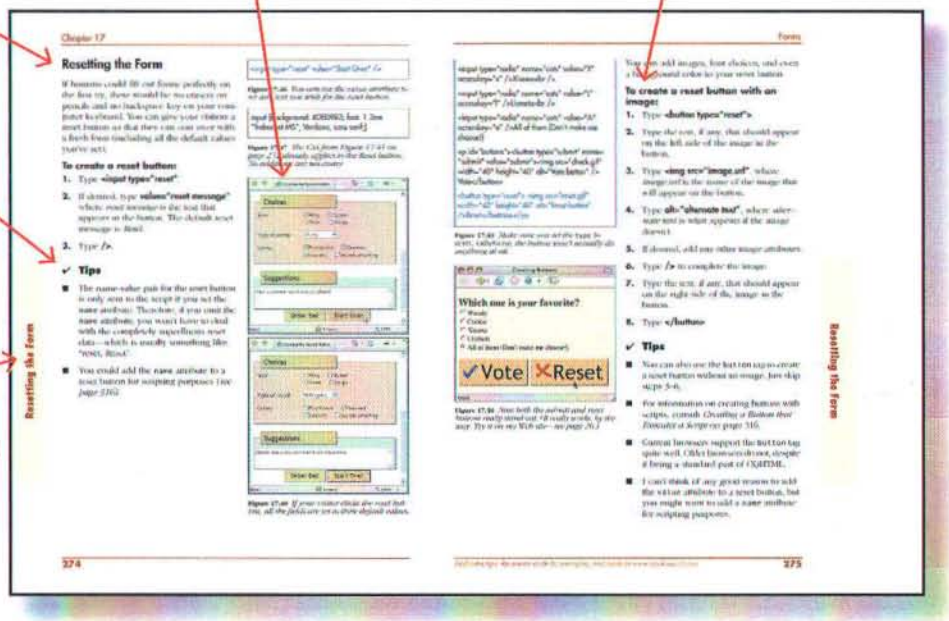
Task-Based
Information is broken down into concise, one- and two-page tasks to help you get right to work.

Visual
Hundreds of screen shots illustrate the steps and show you the best way to do them.

Step by Step
Numbered, easy-to-follow instructions guide you through each task.

Tips
Lots of helpful tips are featured throughout the book.

Quick Reference
Tabs on each page identify the task, making it easy to find what you're looking for.



NAME THE VISUAL QUICKSTART GUIDE BUNNY!

In the spirit of Peachpit's 20th anniversary, and the 15th anniversary of the classic *Visual QuickStart Guide* series, we are asking for your help to name the bunny. For contest details and a chance to win an 80GB iPod®, please visit:

www.peachpit.com/namethebunny

Windows machines, as they need this kind of help and monitoring.

The SA 2000's access privilege management capabilities provide dynamic controlled access at the URL, file, application and server-level. This is based on a variety of session specific variables that include identity, device, security control, and network trust level.

Streamlined manageability of Juniper's SA 2000 provides role-based delegation of administrative tasks and a central management option for more unified administration. There is also a self-service feature for users that lowers help-desk support costs. Auditing and logging is fine-grained, and there are three different secure access methods to allow administrators provision by purpose. The streamlined feature set that the SA 2000 comes with would enable an enterprise to deploy secure remote access as well as a basic customer/partner extranet or secure intranet.

A cluster pair deployment option for the SA 2000 ensures high-availability across the LAN and the WAN.

An advanced license feature for the SA 2000 provides additional state-of-the-art features that would satisfy the needs of other complex deployments of varied audiences and uses, including Juniper's Central Manager. You'll find the SA 2000 Base System for about $2,000, with the Advance License at an additional cost. More information at http://www.juniper.net/products_and_services/ssl_vpn_secure_access/secure_access_2000/

NetScreen-5GT Wireless Firewall/VPN

Ok, so you have your VPN heart with the SA 2000, and your perimeter firewall with the NetScreen-25, what about remote office security? That's where the NetScreen-5GT comes in. The NetScreen-5GT is an enterprise-class network security solution for remote office security.

The NetScreen-5GT Wireless is a part in a series of firewall/VPN line of products offered from Juniper. It is part of an integrated security solution combining stateful firewall, deep inspection firewall, IPSec VPN, antivirus and web filtering for securing a small remote office, retail outlet, or broadband telecommuter.

The NetScreen-5GT is specifically aimed at those that want to run an 802.11 b/g wireless network in a secure setting. But it gives you some fairly sophisticated features including restricted security zones (e.g., home vs. work zones), configurable wireless security zones (each with their own SSID for different types of users), redundancy for high availability, support for dual connections, fast failovers with redundant VPN tunnels and VPN monitoring.

Automator Action Packs!

- InDesign
- Photoshop
- QuarkXPress
- FileMaker Pro
- Finder
- iPhoto
- More!
- Preview
- System
- TextEdit

Enhance Your Existing Workflow

- Increase Consistency
- Increase Efficiency
- Increase Productivity
- Increase Speed
- Reduce Errors
- More Time for Creativity!

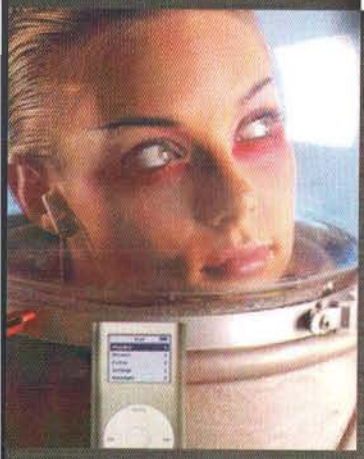
AUTOMATED WORKFLOWS

AppleScript • Automator • Workflow Automation
Products and Custom Development Services

www.automatedworkflows.com

$32 < 1 Year

2 Years > $64

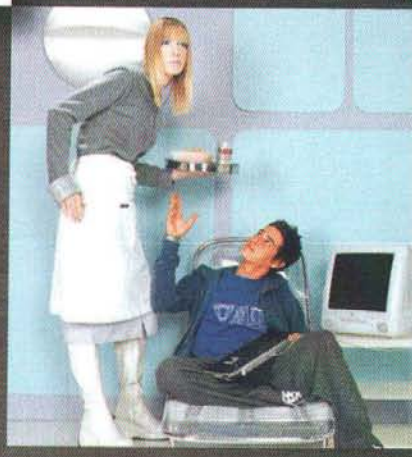


Interviews

Tapping into the world of celebrities and their Macs, only MacDirectory offers exclusive interviews. Get a close and personal view from Sarah Jessica Parker, Steve Jobs, Madonna, Harry Connick Jr., George Lucas, Jennifer Jason Leigh, Steve Woz and other leaders in the Mac community.

Features

Designers, writers, musicians, business leaders & our technical expert team offer their own personal interpretation of things that only the Mac system can deliver. With more than 200 pages of news, insights, trends and the largest Macintosh buyer's guide including over 5,000 Mac products and services.



MacDirectory

BEYOND ANY MACINTOSH MAGAZINE.

Culture

MacDirectory takes you to the wildest corners of the world and uncovers how Macintosh computers are being used by other cultures. Travel to Japan, Australia, Germany, Brazil & Russia and learn more about Apple's cultural impact around the globe.

Reviews

Find out all you need to know about the latest Mac products including the hottest Mac OS software and hardware.

Subscribe >

macdirectory.com

Send check or money order to:
MacDirectory Subscription Dept.
326 A Street, 2C
Boston, MA 02210

NetScreen-5GT Wireless: Front and Back

At a street price of around $1,000, it's a great, integrated solution for those that need a secure remote office or home office, and especially one that wants seamless VPN integration with an SA 2000. For more information, see http://www.juniper.net/products/integrated/ns_5series.html

Conclusion

You need to secure your network – one way or another. If you aren't, you're asking for trouble. Once you do secure your network, run some reports, you'll realize how often people are trying to break in. Miss one patch of some piece of web server software? They **will** break in.

Juniper has a set of world-class products that will protect you without you needing to be a security expert (although, you do need to know what you're doing on **some** level – there's no magic here). Whether you configure them to the hilt, or use them in a more plug-in-play environment, you'll have a level of protection that will give you peace of mind. While you may not want to pay $1,000 for a router, or more for VPN and firewall software, you are protecting your network for a reason. Juniper's offerings will give you an end-to-end solution, that works well with the Mac.

About The Author

The editors of MacTech Magazine are a jolly crew who spend their work time playing with their Macs and their spare time working with their Macs. You can reach them at editorial@mactech.com.

Is your computer running slow?

Maybe it needs a boost

Make your life a little faster and easier,

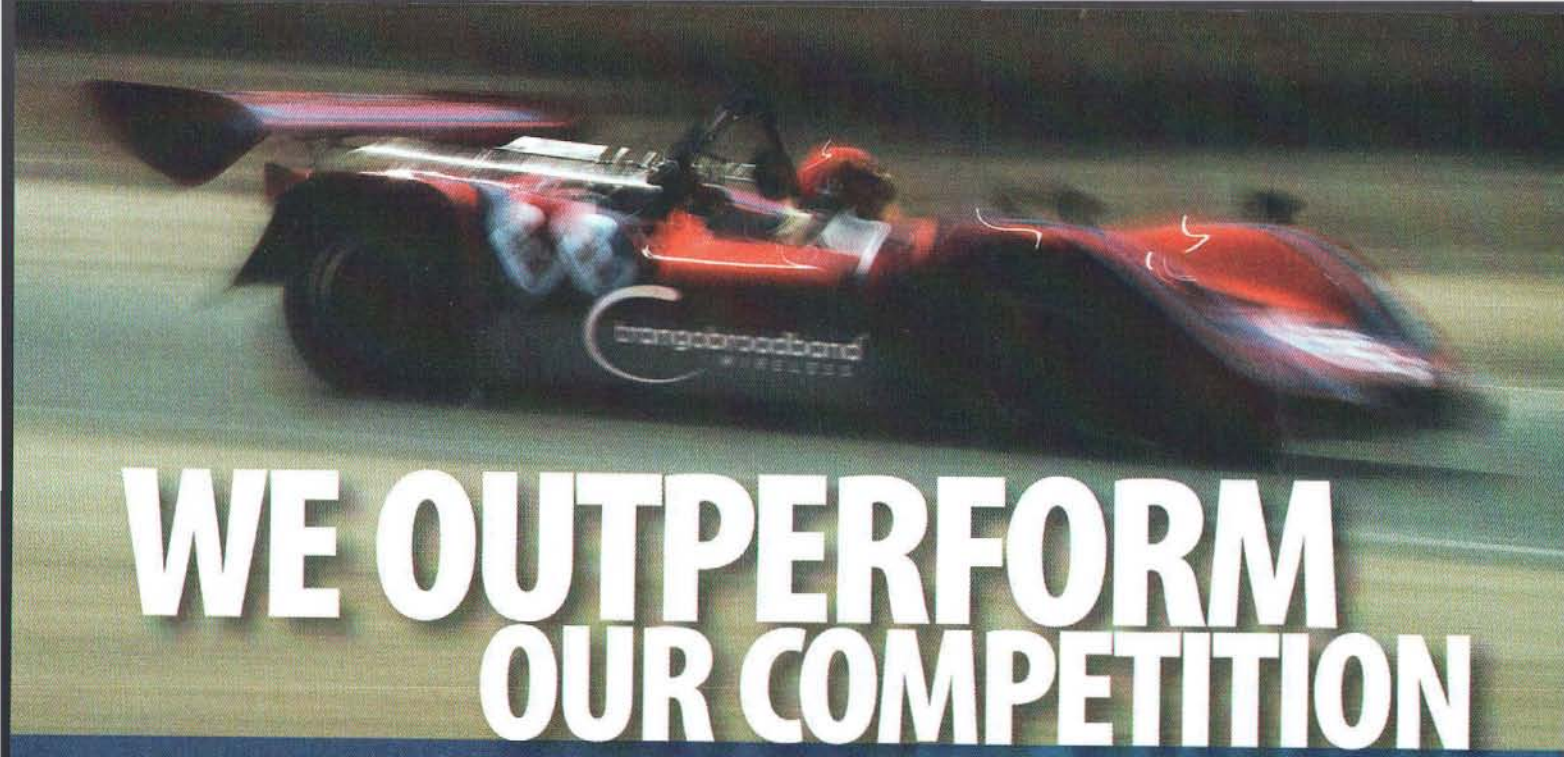
get better RAM.

betterRAM.com sm

Name brand quality. Value pricing. Lifetime guarantee. World class support.

Toll Free: (800) 895-3493 • Outside US/Canada: 805-494-9797 • Fax: 805-494-9798

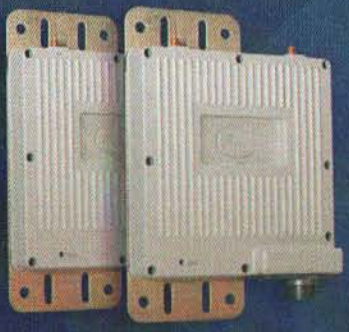
www.betterram.com



WE OUTPERFORM OUR COMPETITION

Nobody beats us on...

- **Price**
  Save thousands on multi-location T1 services
- **Performance**
  6 to 30× faster than T1 service
- **Reliability**
  Best-in-class fixed wireless solutions



Just one of many wireless solutions from Trango...

ATLAS 5010 Series™
Wireless Ethernet Bridge

- 45 Mbps of sustained throughput
- Capable of 5.3 and 5.8 GHz
- Point-to-point, OFDM
- Up to 40-mile range
- Adaptable Rate Modulation

Wireless Connectivity IS Powered by Trango

Trango Broadband Wireless
A division of Trango Systems, Inc.

www.trangobroadband.com
Phone: +1 (858) 653-3900

trangobroadband WIRELESS

Sound Studio 3

By Marianne Shilpa Jacobie, MacTech Staff Writer

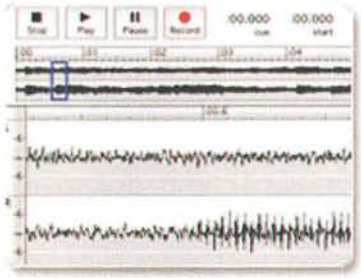
Sound Studio 3 from Freeverse is an easy-to-use Mac OS X application for recording and editing audio digitally. It can be used to digitize tapes and vinyl records, record live performances, create mixes with crossfades, tweak the levels, apply digital effects, and save in all major audio file formats. Sound Studio 3 can also be used to record professional sounding Podcasts, and other audio dialog. Other typical applications of Sound Studio 3 are lectures, voice-notes, sermons, and performances.

Recording features of Sound Studio 3 include multi-track support that enables layering stereo sounds and saving in interleaved format, Audio Unit plug-in effect support, saving in MPEG-4 AAC (advanced audio coding) m4a format, saving in MP3 when the LAME framework is installed, Automator support, 24-bit / 96 kHz sample quality, in stereo or mono, low latency monitoring using Core Audio, and automatic recording starting and stopping based on timers or audio levels. Freeverse recommends iMic from Griffin Technology for use with Sound Studio 3.

Sound Studio 3 comes with some advanced editing functions such as sample-accurate edits, markers (cue points) with text labels, time ruler with units for video and film and copy-and-paste editing.

This product also comes loaded with a cool effects portfolio. It features support for Audio Units, pitch adjustment, reverse audio, and Tone, FM, and noise generators. The "dynamics" group of effects includes compressor, expander, and noise gate. Equalization features include graphic EQ, low pass filter, and high pass filter. Volume effects comprise, amplify, fade in/out/special, and normalize features. Finally, there are the ever-present delay effects, including chorus, flanger, echo, and reverb.

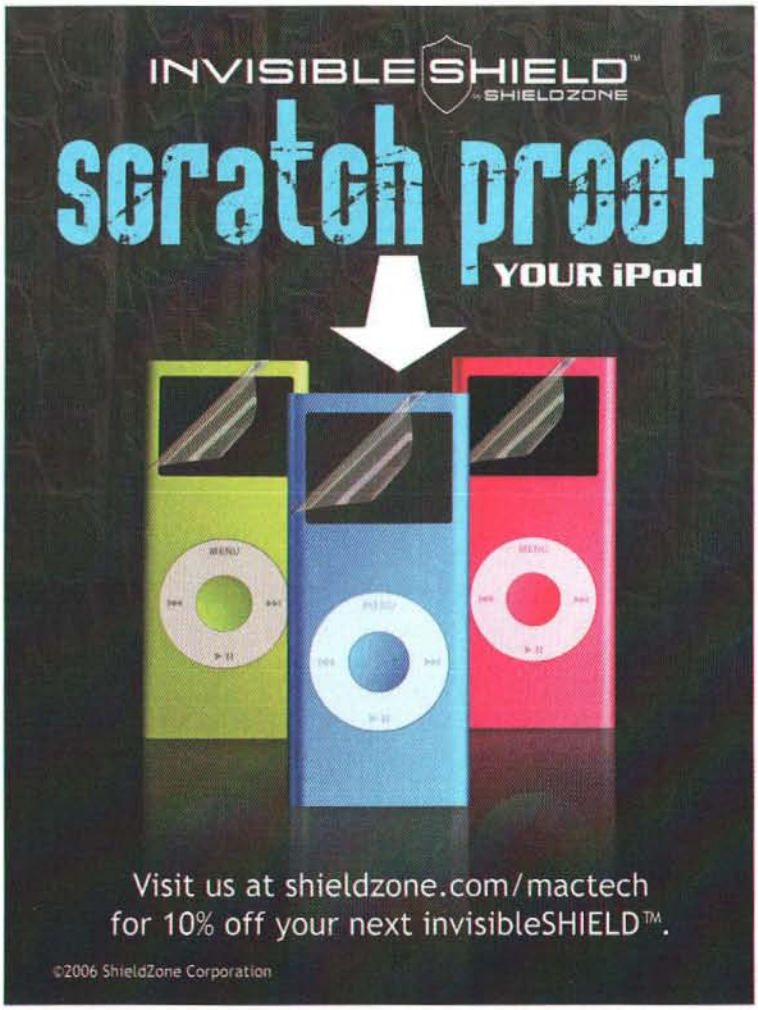
Sound Studio 3 incorporates basic audio repair features. Available functions are interpolation, silence, DC offset, and swap channels. These functions can also be used to repair clicks and pops – typically found on older recordings or material brought in from vinyl.



Sound Studio: Editing Window

Sound Studio 3 supports a variety of file formats such as AIFF (.aif) and AIFF-C (.aifc) with compression including IMA 4:1, AAC and MP3 (importing only), Sound Designer II, Wave (.wav, PCM only), and Tab-delimited text (export only). Sound Studio 3 requires Mac OS X v10.3.9 or later and PowerPC G3 500 MHz or faster with 512 MB RAM. It also requires a minimum of 1 GB hard drive space for storing audio data.

Our conclusion? This is an easy-to-use, but powerful application that gives you the ability to do intricate sound editing yielding professional results. It certainly fills a need for basic editing when ProToos or Logic would be overkill. Sound Studio 3 is priced at $79.95, and available from http://www.freeverse.com/soundstudio/.

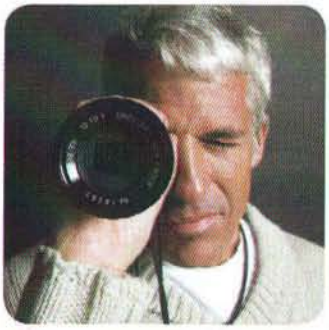


imagine. inspire. ignite.

Conference: January 8-12, 2007
Expo: January 9-12, 2007

The Moscone Center
San Francisco

Macworld
Conference & Expo®



Register TODAY

Priority Code: A-MT2

macworldexpo.com/register

Give your professional talent room to grow at an event that's as stimulating as it is creative. Get inspired at Macworld Conference & Expo 2007. You'll immerse yourself in five exciting days of the largest gathering of Mac industry experts, pundits and enthusiasts. Plus, cultivate new skills and get the indispensable tools you need to ignite your imagination and fuel your Mac soul. Macworld Conference & Expo. Imagine the radical possibilities.

Height and Angle FootRester

No matter how you slice it, people are built differently. It's important for people to be not only comfortable but to support their body in the right way. Part of that is foot position, and having your feet, legs and body at the right angles.

If you are looking for a footrest to attain a proper ergonomic position while at work, the WorkRite Ergonomics' Height and Angle FootRester may be your answer. The FootRester has both height and angle adjustment that locks into place automatically. And, the platform rocks back and forth to change with your body position.

The platform is 23 inches wide and 11 ? inches deep, and it is adjustable in increments of 1 inch from 4 inches to 15 inches of maximum height from the floor. The FootRester is constructed of a heavy gauge steel frame and 3/8-inch thick composite plastic that can withstand tough use.

We've used the FootRester for a few months, and found it to increase comfort and improve the ergonimic position. Better yet, it only took a day or so to be so comfortable with it, that we forgot about it. Height and Angle FootRester weighs 15 lbs.

Cost: $152

URL:

http://www.workriteergo.com/products/productmain.asp?FamID=25

-MacTech Staff

RADIOTOPE
TECHNOLOGY CONSULTING

Aligning business goals and technology.
Bringing enterprise solutions to
small and medium businesses.

email: info@radiotope.com
http://www.radiotope.com

When your customers need a helping hand, don't you want to be there?

With Mac HelpMate Pro, you're just a click away.
www.MacHelpMate.com/testdrive

Mac HelpMate Professional features:

- *Zero-configuration screen sharing (no IP address, no router tweaking necessary). It works through 90% of firewalls and NATs. Reach anyone in the world wherever they are, wherever you are ...*
- *Your company's image and logo on the splash screen of the application reinforces your brand, services and sales offerings as well as generates new opportunities*
- *Automated maintenance tasks create billable subscription-based services*
- *One unlimited license covers installation for all of your customers' workstations*
- *Cross platform: Mac - Mac, Mac - Win, Win - Mac and Win - Win*

Mac HelpMate Professional ™ is a product of MOST Training & Consulting
www.macworkshops.com

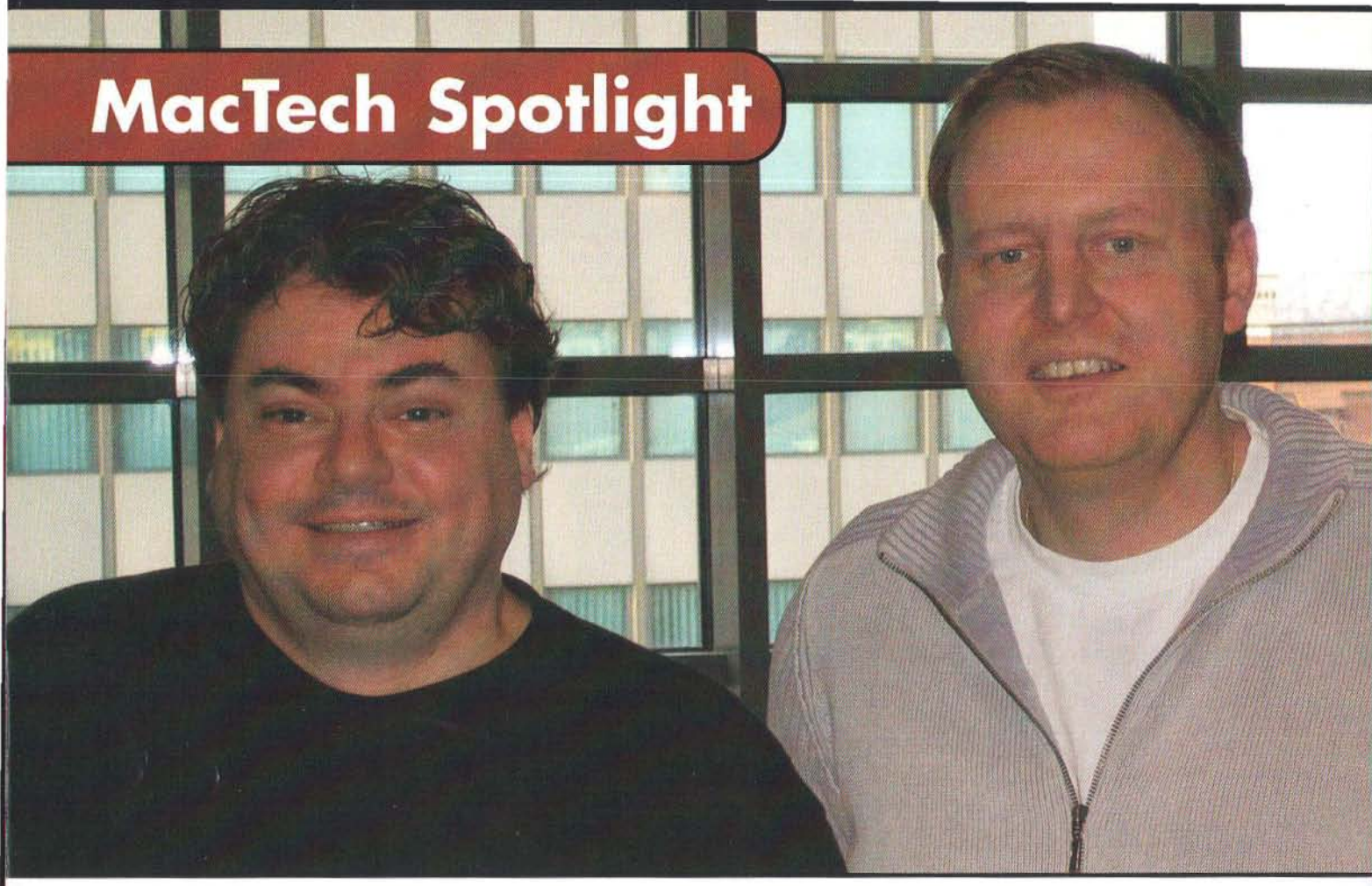
Advertiser/Product Index

Aladdin Knowledge Systems, Inc. 55
Allume Systems, Inc. ..... BC
Allume Systems, Inc. 7
Allume Systems, Inc. 55
Allume Systems, Inc. 71
AMCC 37
Automated Workflows, LLC 46
BetterRAM.com 82
Bönig und Kallenbach oHG 22
Brad Sniderman 78
Critical Path Software, Inc. 59
Equilibrium 73
FileWave (USA), Inc. 13
Garrison Computer Services 41
Home Controls, Inc. 52
Idea Storage Networks LLC 39
IDG World Expo Corporation 85
IGC, Inc. / MaxEMail.com 17
Intego, Inc. ..... IFC
Intel Corporation 1
Intel Corporation 45
JCHS Media Pte Ltd. / Mobile Juice 72
Kerio Technologies Inc. 66
Laptops For Less 49
MacDirectory 81
MacForge.net 48
MacResource Computers & Service 42
MacTech Magazine 62
MacTech Magazine 69
MARX CryptoTech LP 58
Meta Communications 77
Metafy LLC 16
MicroReplay, Inc. 61
MOST Training and Consulting 86
MYOB US, Inc. 9
Netopia, Inc. 65
NetTeam Consulting 35
Network Hardware Resale 74
Now Software 29
OlympicControls Corp. 51
Opera Software ASA 53
Other World Computing 23
Other World Computing 47
Ovolab 33
Peachpit Press 79
Protective Solutions Inc. 84
Radiotope 86
REAL Software, Inc. 4
Robosoft Technologies Pvt. Ltd. 2
Seapine Software, Inc. 11
Small Dog Electronics 89
Spiderworks 63
Spymac Network, Inc. 75
SubRosaSoft.com, Ltd. 19
Trango Broadband Wireless 83
Tropical Software, Inc. 44
Underwriters Technologies 70
UPS for LESS 21
Utilities4Less.com 67
VersionTracker 49
WIBU-SYSTEMS AG 57
WorldSync, Inc. 20

3ware Sidecar • AMCC 37
AccountEdge • MYOB US, Inc. 9
Anthracite Web Mining Desktop Toolkit • Metafy LLC 16
AquaZone • Allume Systems, Inc. 7
Batteries and Accessories • Laptops For Less 49
BookEndz • OlympicControls Corp. 51
Cables • MacTech Magazine 62
Catalog • Other World Computing 23
Check It • Allume Systems, Inc. 55
Cisco Hardware • Network Hardware Resale 74
Clean Up • Allume Systems, Inc. 71
CopyCatX/FileSalvage • SubRosaSoft.com, Ltd. 19
CRYPTO-BOX • MARX CryptoTech LP 58
DeBabelizer • Equilibrium 73
Development Services • Critical Path Software, Inc. 59
Development Services • Robosoft Technologies Pvt. Ltd. 2
Digital Storage Manager • Meta Communications 77
FileWave • FileWave (USA), Inc. 13
fmSQL Synch • Garrison Computer Services 41
HASP • Aladdin Knowledge Systems, Inc. 55
Home Automation • Home Controls, Inc. 52
Intel Compiler • Intel Corporation 45
Intel Compilers • Intel Corporation 1
Kerio Server Software • Kerio Technologies Inc. 66
Law Offices • Brad Sniderman 78
Long Distance Phone Service • Utilities4Less.com 67
Mac HelpMate • MOST Training and Consulting 86
Mac Mini Co-lo • Underwriters Technologies 70
MacDirectory • MacDirectory 81
MacResource Computers • MacResource Computers & Service 42
MacTech CD • MacTech Magazine 69
Macworld Expo • IDG World Expo Corporation 85
maxemail.com • IGC, Inc. / MaxEMail.com 17
MicroReplay • MicroReplay, Inc. 61
Mobile Juice • JCHS Media Pte Ltd. / Mobile Juice 72
NetTeam Server • NetTeam Consulting 35
Now Up-to-Date • Now Software 29
NuPower Batteries • Other World Computing 47
Open Source Directory • MacForge.net 48
Opera 9 • Opera Software ASA 53
Peachpit Press • Peachpit Press 79
Phlink • Ovolab 33
RAM • BetterRAM.com 82
REALbasic • REAL Software, Inc. 4
Screen Protection • Protective Solutions Inc. 84
Scripting Solutions • Automated Workflows, LLC 46
Security and Protection • WIBU-SYSTEMS AG 57
Seefile • Idea Storage Networks LLC 39
SERVICE USB • Bönig und Kallenbach oHG 22
SmallDog.com • Small Dog Electronics 89
SpiderWorks ebooks • Spiderworks 63
Spymac • Spymac Network, Inc. 75
StuffIt • Allume Systems, Inc. ..... BC
SyncDek • WorldSync, Inc. 20
Technology Services • Radiotope 86
Test Track Pro • Seapine Software, Inc. 11
Timbuktu • Netopia, Inc. 65
TopXNotes • Tropical Software, Inc. 44
Trango Broadband • Trango Broadband Wireless 83
UPS Equipment • UPS for LESS 21
VersionTracker Pro • VersionTracker 49
VirusBarrier • Intego, Inc. ..... IFC

The index on this page is provided as a service to our readers. The publisher does not assume any liability for errors or omissions.

MacTech Spotlight



Lobotomo Software
Christoph Nadig and Pascal Freiburghaus
http://www.lobotomo.com

Company Info:
Lobotomo Software is not really a company, but a hobby creating cool tools that are missing in OS X (until we make them).

How long have you been doing what you do?
We started Lobotomo Software in fall 2003 - when we thought of a bunch of tools interesting enough to share

Your first computer:
The first computer we put our hands on was a Commodore VIC-20. This was followed by a number of fully or semi home built systems with not particularly mainstream architectures: 68k, DEC Alpha and PPC. Thanks to Apple we finally made it into Intel World (not sure yet If we should feel comfortable there yet...)

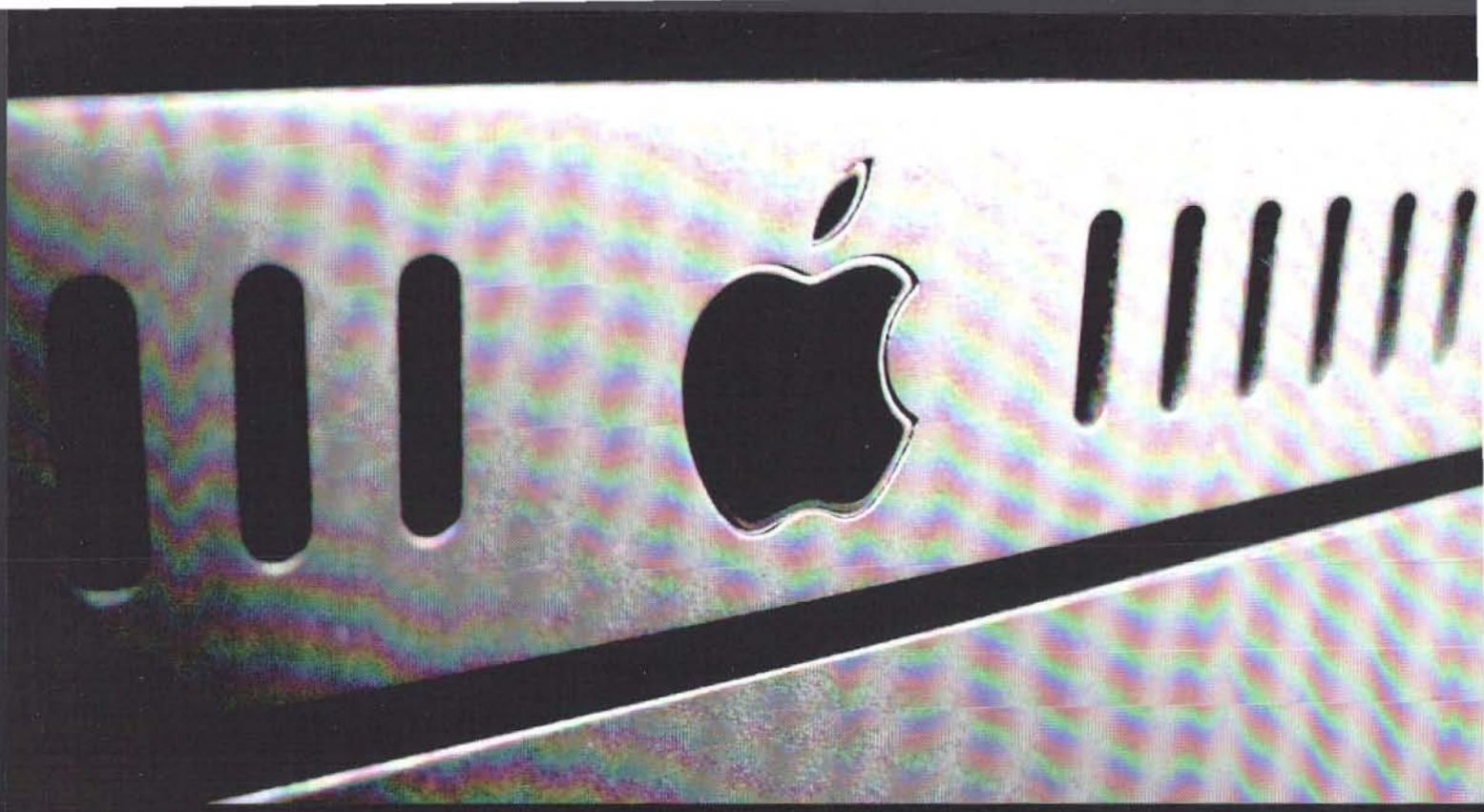
What attracts you to working on the Mac?
The Mac is designed from a users perspective, not a technical one. This always reminds us to write software that gives a user the best benefit instead of delivering the most fancy technical solution.

What's the coolest tech thing you've done using OS X?
With WinShortcutter we bridged the Inferior to the Superior. Dirty job, but someone had to do it...

Ever?
http://www.lobotomo.com/products/FanControl

Where can we see a sample of your work?
Please have a look at http://www.lobotomo.com or ask Mr. Google for Lobotomo Software to see how and where our software is used

The next way I'm going to impact IT/OS X/the Mac universe is:
With IPSecuritas 3.0, which will soon be released in the final version, we'll provide a huge leap forward in functionality and user comfort, superceeding competing products. Like earlier version of IPSecuritas, version 3.0 will be freeware.



From our server room to yours.

Small Dog Electronics is the third largest Apple Specialist in the US. We offer over 4000 Mac-compatible products, including new and Apple Refurbished Xserves, Xserve RAID's, RAM, hard drives, networking gear, and much more.

We've earned our place in the Apple community with our famously superior customer service, great prices, and by staying true to the Apple platform.

We are here to help you. Give us a call, or visit us at Smalldog.com!

Small Dog Electronics is 100% Mac-based. We're powered by: 14 Xserves + 4 G4 Servers + 3 T1 lines + Heaps of Cisco Routers + 4 Miles of CAT 5 + 13 kW Propane Back-up Generator + 13 Network Cameras + 1 Firewall + 40 Mac Workstations + 40 Apple Product Professionals + 14 dogs of all shapes and sizes!

$6.00 off shipping on your next order!
Simply enter coupon code "mactech" when checking out at Smalldog.com!
Coupon good through 5/31/07

Small Dog Electronics
Always by your side.

www.smalldog.com 800-511-MACS

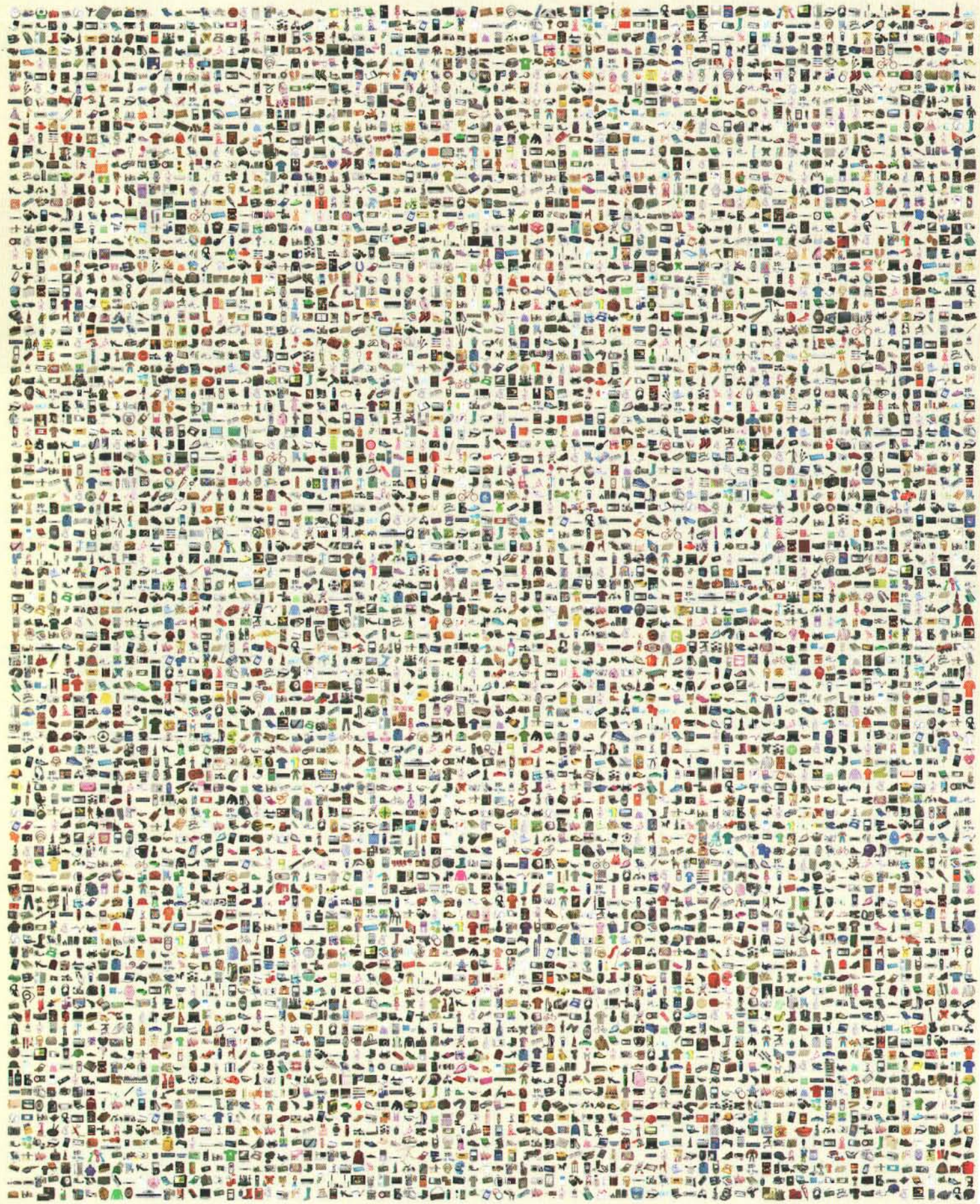
Apple Specialist

THINGS MADE IN CHINA

COMPRESSED BY

STUFFIT DELUXE

SOFTWARE FOR MAC/PC



DOWNLOAD AT STUFFIT.COM/COPYRIGHT ® AND © 2006 ALLUME SYSTEMS, INC.